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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

The Vintage of 1911.

The Government Statist reports a record vintage for the State for 1911, 3,420,058galls. of wine being made against 2,569,797galls. for 1910, an increase of 850,261galls., or 33.09 per cent. This included the wine made for distillation purposes, which is now a considerable item. Probably upwards of 2,000,000galls. of the present vintage will be distilled. The wine in stock on June 30th last amounted to 5,310,691galls. (4,971,658galls. in 1910), the stock having increased by 339,033galls. The following are the exports of wine during the last five years:—

Year.	Quantity. Gallons.	Value. £
1906.....	562,819 ..	99,247
1907.....	737,664 ..	120,393
1908.....	760,526 ..	123,957
1909.....	1,045,678 ..	156,083
1910 (a)	814,883 ..	121,305

(a) Inter-State records having ceased to be kept on September 13th, 1910, the inter-State exports from that date are not available.

The quantity of currants produced was 39,760 (36,052) cwts., an increase of 3,708cwts. Sultanas—Production, 15,255 (11,296) cwts.; increase, 3,959cwts. Other raisins—Production, 19,790 (16,512) cwts.; increase of 3,278cwts.

Export of Lambs for 1909-10.

The total export of lamb and mutton from South Australia for last season was 195,436 carcasses, or 41,000 in advance of the previous year, but 76,000 behind the output of the record year of 1907-8. The falling off is attributed by the Manager of the Government Produce Department (Mr. G. A. W. Pope) to the fall in London prices in 1908-9. An all-round improvement in quality is noted. On the question of the capacity of the State slaughtering works Mr. Pope says—"It is the greatest folly to crowd the weekly market beyond the capacity of the works, and if it is necessary to pass the majority of the lambs through the Adelaide market, more market days per week must be provided, so that the lambs can be slaughtered promptly the day following the sale. The department is prepared to work to its full capacity of 40,000 per week, provided the quantity systematically available warrants such an action; but spasmodic arrivals of stock, making one day's full work with

nothing for its successor, creates a labor difficulty which is insurmountable under the present scale of charges. It is not reasonable to ask butchers and laborers to stand by for a partial week's work, nor is it reasonable to expect producers to provide the wages of men for enforced idleness; hence the policy of the department for the coming season will be to spread available work evenly over the six working days of the week." The comparative average gross prices in London for Australian lambs per pound during 1909 and 1910 were as follows:—

	1909.		1910.		Increase.
	d.		d.		d.
Good average quality	3-70	..	4-62	..	0-92
Fair average quality	3-45	..	4-42	..	0-97
Inferior quality	3-22	..	4-35	..	1-13

A Wheat Trade with Spain.

In his recent article on "Agriculture in Spain," Professor Perkins referred to the possibility of Australia exporting wheat to that country, which now draws her foreign supplies chiefly from Russia. In this connection the following paragraph from *Broomhall's Corn Trade News* of June 20th is interesting:—"The Spanish Minister of Finance is contemplating the establishment in Spain of free depots for cereals. The project has caused a certain amount of alarm amongst the Castillian graingrowers, in whose name the President of the Diputacion Provincial of Valladolid has addressed a telegram to Mr. Canalejas, urging that protective measures be taken. On the other hand, the Government has received several claims from Barcelona and the eastern provinces requesting that no further duties be levied on foreign wheat. A commission from Santander has also visited the Prime Minister, asking to have free depots established."

Apples for New York.

"The progressive producers of the Southern Hemisphere propose to go a long way around to strike the bare midsummer markets of the Atlantic coast with their winter apples which ripen in their autumn, which answers to our springtime," writes the *Pacific Rural Press* of May 27th. "A New York firm of fruitsellers announces the completion of arrangements by which a quantity of Tasmanian apples in boxes will come to them in New York during next July. The fruit reaches London from Tasmania in the refrigerators of fast steamers, and will be transhipped in London to the refrigerators of the Atlantic Transport Company's boats, and in this way the apples will

be in refrigerators all the way from Tasmania. While there are several of the varieties known to the American fruit trade, such as Jonathans, Rome Beauties, Scarlet Pearmaines, New York Pippins, and other kinds, many of the prospective arrivals are new varieties, but, generally speaking, they are not high-colored red apples. When the Panama Canal is finished our southern friends will not have to go such a long way round to reach New York. They are enterprising in trying to open a market in advance of that date."

Value of Milk Records.

The necessity for dairymen keeping a proper record of the milk yields of their cows is emphasized by figures published in the *Journal of Agriculture* of Victoria. Mr. F. J. Stanmore, a large dairyman of Pcmbarneit, furnishes the results of a year's tests with 141 cows; of these, 19 gave only 300galls. per head per annum, while one yielded 900galls.; 54 cows gave less than 500galls., while 27 yielded from 650galls. upwards. The average quantity of milk delivered at the factory was 539galls. per cow, with an average of a fraction over 4 per cent. of butter fat. The cost of feeding and handling the herd is put down at £5 10s. per cow per annum. Nineteen cows gave a profit of only 12s. 6d. each per annum, and 64 less than £4 15s. Were this herd culled of all cows giving less than 500galls. per cow, the profit would have reached £6 18s. 9d. per head instead of £5 8s.

Canon-Firing for Rain-Making.

A mischievous belief in the efficacy of cannon-firing as a means of breaking a drought or causing clouds to disgorge their rain is very widely spread. If the firing of heavy ordnance did have any such effect we should expect Shoburnness to be one of the rainiest places in England, because of the trial firing of great guns there; but in point of fact the neighborhood is the least rainy in England. On the other hand, we find Benvenuto Cellini, who flourished in the sixteenth century, claiming that the use of guns actually prevented rainfall. Cellini writes thus—"When the duchess made her entry into Rome I prevented a damage of above a thousand crowns that they were likely to suffer by a heavy rain, upon which occasion, when the Constable was almost in despair, I had revived his drooping courage by pointing several pieces of artillery towards that tract of the heavens where the thickest clouds had gathered, so that when the shower began to fall I fired my pieces, whereupon the clouds dispersed and the sun again shone out in all its brightness. Therefore it was entirely owing to me that the above day of rejoicing had been happily concluded."

Moisture in Butter.

In an address before the Factory Managers' Conference in Melbourne Mr. R. Crowe referred to the question of moisture in butter, and stated that experiments carried out some years ago by the department in various parts of the State showed that there were three controlling factors which, given due attention, will result in the moisture content of butter being kept within reasonable limits. The first is that the cream must be reduced to a uniformly low temperature; second, to have the rinsing water used in the churns of the same degree of heat as the cream; and thirdly, to permit draining to take place at intervals during the process of working. If the rinsing water is of a higher temperature than the cream there will be a higher moisture content in the butter, while a similar result follows if the working is not stopped after adding salt and preservatives until the product is finished. It is recommended to stop twice during the working to permit the expressed water to drain away.

Colt Sense.

Make friends with the colts. Pet and handle them while they are young. Take time to slip the halter on them occasionally; but do not expect them to lead right off. They do not know what you require of them. Deal gently with them on the start, and the first thing you know they will be leading up like an older horse. What is the use of waiting to be yanked around in breaking a big, strong, two-year-old colt? Curry and brush them, too, up one side and down the other, clear to the hoofs. It takes lots of time to teach them to be curried if you wait till they are two or three years old; and then, when you do try to break them in, you are liable to get kicked. Get the young horses accustomed to buckles and straps. It is a good plan to lay a light set of harness on them occasionally; but be very careful not to put a flimsy halter on them that they can break, and see that they never get loose with any straps or ropes dangling about. You do not want to train the colts to pull back, kick, or be runaways.—M. ALBERTUS COVERDELL.

Inspection of Fruits and Vegetables for Broken Hill.

At the conference of Ministers of Agriculture, held in March last, it was decided to adopt the principle of one inspection only in relation to these articles, and that to take place at the destination of the goods. This, of course, would be embodied in the regulation to be made by the various States, and the New South Wales Government have now agreed to give a trial to this practice in respect to the produce trade with Broken Hill. Dealers, fruit growers, and other exporters will therefore (after July 31st) not be called upon to submit their goods for examination and certification prior to export

to Broken Hill. It should, however, be noticed that potatoes are not included in this arrangement, and the New South Wales Government reserves the right to again insist on the certificates accompanying the goods if the quality of the produce deteriorates.

Imports and Exports of Fruits and Plants.

During the month of July 14,748bush. of fresh fruits, 846 bags of onions, 7,210 bags of potatoes, and 77pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act, 1885; 264bush. bananas and 15bush. of mandarins (chiefly over-ripe) were rejected and destroyed; at Serviceton 181bush. of fresh fruits were examined and admitted. Under the Federal Commerce Act 1,681 cases of fresh fruit, 54pkgs. preserved fruit, 100pkgs. dried fruit, 106pkgs. honey, and 3pkgs. plants were exported to oversea markets during the same period. These were distributed as follows:—For London, 637 cases citrus fruits, 106pkgs. honey, and 1pkg. trees; for Germany, 72 cases citrus fruits; for New Zealand, 511 cases citrus fruits, 100pkgs. dried fruit, and 1pkg. plants; for India and East, 420 cases apples, 42 cases citrus fruits, 54pkgs. preserved fruit, and 1pkg. vines. Under the Federal Quarantine Act 1,544pkgs. plants, seeds, bulbs, &c., were admitted from oversea sources.

Ostrich-Farming in the United States.

The keeping of ostriches has now become a very profitable industry in California. The main feature is that the profits are so big, the estimate reaching something like £30 per bird in full plumage. This is accounted for by the fact that there is an import duty of 15 per cent. on all feathers imported into the United States, and that the company does away with all the middlemen's profits by preparing the feathers themselves and selling only in retail parcels. In addition to that a large revenue is derived from visitors to the farms, this source bringing in some £3,000 a year. This is rendered possible by the fact that the farms are situated in close proximity to large centres of population, and are thus turned into a pleasure resort for the curious. The original flock consisted of 50 birds imported by Mr. Edward Cawston from South Africa in 1886. New blood has been introduced from time to time from North Africa, and the stock now appears to be about 800.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

SPAYING YOUNG SOWS.

"E. J. R.," Monteith, asks what is the proper age to spay young sows.

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"The proper age is from three to four months old."

WARTS ON COW'S TEATS.

"F. W. G.," Parrakie, asks for a remedy for removing warts from cow's teats, the kind that dry up when the cow is dry and enlarge when in milk.

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"If the warts are persistent, it is advisable to have them cut off with sharp scissors, and caustic (nitrate of silver) regularly applied afterwards. The regular application of castor or olive oil to the teats after milking usually removes the class of wart referred to."

BLOOD IN COW'S MILK.

"Talia" asks—"What is the cause of blood in cow's milk? The cow has only been calved about 15 days. Is the milk fit for human consumption?"

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"The presence of blood in the milk may be due to injuries, the existence of disease, *e.g.*, tuberculosis or actinomycosis, the eating of irritant plants; in the case referred to it is probably only of a temporary character; but whilst the blood is present it is unadvisable to use milk for human consumption. The owner should give the cow a dose of laxative medicine, *e.g.*, $\frac{1}{2}$ lb. Epsom salts, $\frac{1}{2}$ lb. molasses, in a quart of warm water."

LICE ON PIGS.

"H. S. H.," Yorketown, asks for a method of killing lice on pigs.

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"For destruction of lice on pigs it is necessary to pay particular

attention to the sanitary condition of the sties and paddocks. The usual sheep-dip preparations are very effectual, or kerol or creolin in 1 per cent. to 2 per cent. solution, and the best method is to dip or spray the pigs. In order to destroy the young ones and eggs it is advisable to re-apply in about a fortnight's time."

PLANTING FRUIT TREES.

"Gardener," Caltowie, asks for information as to the best time to plant fruit trees, where to obtain reliable trees, what cultivation is required, and how far apart to plant.

Reply—It is usually acknowledged the best time to transplant fruit trees, more especially in dry areas such as yours, is early in the winter, whilst the soil is still warm. The root injury is then repaired before the tree takes its winter rest. The following are a few of the leading fruit-tree nurseries:—H. Wicks, Payneham; A. O. Pike, Hectorville; H. Sewell, Payneham; E. & W. Hackett, Marryatville; and H. Copas, Findon. The trees should be set about 20ft. apart on the square system, that is, each tree stands in the corner of a square, the side of which is 20ft. long; the ground should be broken 15in. to 18in. deep all over before planting the trees. The tillage recommended for districts of restricted rainfall is to plough or dig the ground over roughly in early winter so as to catch all of the rain and permit its even distribution in the soil. In early spring skim-plough or dig under any weeds and then keep the surface loose to retain the moisture. If an opportunity offers, run any storm water available into the garden during the winter season.

BACON-CURING AND PICKLING PORK.

"Bacon" asks for a good recipe for curing bacon and pickling pork.

Reply—After dressing, the carcass should hang sufficiently long to allow of the flesh setting; then cut down and lay the sides upon a slab or table with the rind downwards. With the aid of a fine horse-hair sieve, sprinkle the following mixture lightly all over the flesh:—Powdered boracic acid, two parts; powdered saltpetre, one part; and allow it to remain on for 24 hours. This should be followed by rubbing well in a mixture made up in the following proportions:—Best fine-grained salt, 50 parts by weight; powdered saltpetre, five parts by weight; sugar, five parts by weight; boracic acid, five parts by weight. All the above to be finely powdered and mixed together. Care should be taken to remove the joint oil from the ham. This can be done with the point of the knife; at the same time clean it well out and fill it with boracic acid; also attend to the cavity under the shoulder blades in the same way. The bacon or sides should be well rubbed with the above mixture every day for about a fortnight when it can be washed with warm water and hung up for three days (according to the weather); then smoke for 30 to 40 hours.

Pork Pickle.—Mix the following with sufficient water to make a solution of 20galls. :—Salt (fine and good), 50lbs. ; saltpetre, 5lbs. ; sugar, 8lbs. ; boracic acid, 5lbs. The mixture should be stirred or boiled till all the solids are dissolved, and allowed to stand for 24 hours, when any sediment will have settled. The clear pickle can then be removed and stored for use as required.

AMERICAN POULTRY SYSTEM.

“Poultry-keeper,” Salisbury, writes—“Can you give me information with regard to the value of the Walter Hogan system of poultry selection ; also the address to which application for the system has to be made ?”

The Poultry Expert (Mr. D. F. Laurie) replies—“I am not impressed with the value of the Walter Hogan system, which is one of many advertisements in America.”

GYPSUM AND SUPERPHOSPHATE.

“Koppio” asks—“1. Will gypsum fertiliser applied to magnesia patches have a beneficial effect in counteracting its influence on plant growth ? Will it do harm ? 2. Will it deteriorate superphosphate if mixed with it to run through a drill ? 3. Is gypsum supposed to retain ammonia in farmyard manure ? How should it be applied, and what quantity to the ton of manure ? 4. Will superphosphate deteriorate to any appreciable extent if kept over till next season ?”

Answer—“1. Gypsum is of special use in alkali patches when the salt inducing sterility is carbonate of soda. If there be in the patches you refer to a certain amount of carbonate of soda, which is very likely, the application of gypsum would be beneficial. 2. Gypsum will not deteriorate superphosphate. Superphosphate, as manufactured, has a big percentage of gypsum or sulphate of lime present in the manure. 3. Gypsum is of some use in retaining ammonia in farmyard manure, but considerable quantities require to be applied, from $\frac{1}{2}$ cwt. to 1cwt. of gypsum to each ton of manure. 4. Superphosphate will revert a little if kept over till next season, but the depreciation would be comparatively small for general farm purposes.”

ROSEWORTHY AGRICULTURAL COLLEGE.

Fourth Report on the Permanent Experiment Field, Seasons 1909-10 and 1910-11.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College,
and W. J. SPAFFORD, Assistant Experimentalist.

(Continued from page 1154.)

BARE FALLOW-WHEAT-PASTURE ROTATION.

This constitutes a form of rotation, common enough to the north of Adelaide, in which land comes under wheat once in three years, being preceded by bare fallow and succeeded by pasture. It at once challenges comparison with the shorter Bare Fallow-Wheat Rotation in which land comes regularly under wheat in alternate years. We have summarised below in Table XXI. the wheat returns of the former rotation secured in the Permanent Experiment Field, in comparison with those of the latter. It should be stated that in each case the wheat crop is regularly dressed with 1cwt. of superphosphate.

TABLE XXI.—*Showing Wheat Returns in Bare Fallow-Wheat-Pasture Rotation Comparatively with those of Bare Fallow-Wheat Rotation.*

BARE FALLOW-WHEAT-PASTURE ROTATION—PER ACRE.				
	1908.	1909.	1910.	Means.
Total Produce..	2t. 11c. 55lb.	2t. 10c. 56lb.	2t. 10c. 71lb.	2t. 10cwt. 98lb.
Grain	29bush. 21lbs.	26bush. 37lbs.	19bush. 2lbs.	24bush. 53lbw.
Straw to 60lbs. grain	139lbs.	152lbs.	238lbs.	176lbw.
Bushel weight .	63½lbs.	62½lbs.	63½lbs.	63½lbw.
BARE FALLOW-WHEAT ROTATION—PER ACRE.				
	1908.	1909.	1910.	Means.
Total Produce..	2t. 11c. 26lb.	2t. 7c. 61lb.	2t. 5c. 98lb.	2t. 8c. 24lb.
Grain	32bush. 47lbs.	29bush. 54lbs.	19bush. 49lbs.	27bush. 31lbs.
Straw to 60lbs. grain	115lbs.	118lbs.	199lbs.	144lbs.
Bushel weight .	64½lbs.	62½lbs.	64½lbs.	63½lbw.

Thus we see that, so far as the three years under consideration are concerned, the advantage is all with the shorter form of rotation in the matter of cereal returns. The mean returns of total produce, representing roughly the hay yield are, however, about 2½cwt. higher where wheat has been grown once in three years; the grain yield, on the other hand, is about 2½bush. less and the bushel weight ½lb. less. It would appear, therefore, that a year's pasture is more conducive to flag and straw growth than to that of grain. It is thus that we find that when wheat is grown regularly in alternate years

the straw yield has been represented by 144lbs. of straw for every bushel of grain, whilst where pasture intervenes the proportion of straw has risen to 176lbs.

The gross money returns from these two forms of rotation cannot be compared unless we take into consideration a period of six years, in which for one rotation there would have been two crops of wheat and for the other three ; and as a set-off against the extra wheat crop of one rotation there are the returns from two years' grazing in the other.

We have already shown elsewhere that the gross returns from the Bare Fallow-Wheat Rotation may be represented by £5 7s. 6d. an acre for a period of two years ; hence, in the six-year period we have under consideration, it would be represented by £16 2s. 6d. We shall now endeavor to ascertain the gross returns of the longer rotation on similar lines. We append below the gross returns from the wheat crops and ordinary stubble grazing.

TABLE XXII.—*Showing Gross Returns in Bare Fallow-Wheat-Pasture Rotation of Wheat Crop and Stubble Grazing.*

Grain Crop.			Stubble Grazing.				
Year.	Yield per Acre.	Value at 3s. 6d. a Sheep.	Sheep per Acre.	Number of Days Grazing.	Equivalent Sheep per Acre per Annum.	Value at 15s. a Sheep.	Total Gross Returns.
	bush. lbs.	£ s. d.				s. d.	£ s. d.
1908 ...	29 1	5 1 7	5.59	54	0.83	12 5	5 14 0
1909 ...	26 37	4 13 2	5.58	14	0.21	3 2	4 16 4
1910 ...	19 2	3 6 2	7.09	7	0.14	2 1	3 8 3
Means..	24 53	4 7 0	6.07	25	0.39	5 11	4 12 11

Thus the gross returns in the Rotation Bare Fallow-Wheat-Pasture of the wheat years have worked out at £4 12s. 11d. an acre. This represents, therefore, in the six-year period a sum of £9 5s. 10d. We have still to determine the gross returns derived from the two pasture years ; these we have summarised table below in Table XXIII. for the years for which we possess completed returns.

TABLE XXIII.—*Showing Gross Returns from Pasture Years in Rotation Bare Fallow-Wheat-Pasture.*

Year.	Days Grazing.	Sheep per Acre.	Equivalent Sheep per Acre per Annum.	Value of Grazing at 15s. a Sheep.
				£ s. d.
1906	120	10.20	3.35	2 10 3
1907	127	6.87	2.39	1 15 10
1908	173	6.44	3.05	2 5 9
1909	121	9.79	3.25	2 8 9
Means.....	135	8.33	3.01	2 5 2

Thus the gross pasture returns from the Bare Fallow-Wheat-Pasture Rotation have averaged out at £2 5s. 2d. per acre per annum ; for the six-year period under consideration they represent, therefore, a sum of £4 10s. 4d.

This sum when added to the gross returns of the two wheat years becomes a general total of £13 16s. 2d., representing the total gross returns per acre of the Bare Fallow-Wheat-Pasture Rotation in a period of six years. The gross returns from the Bare Fallow-Wheat Rotation we have seen to be represented for the same period by the sum of £16 2s. 6d., leaving a balance of £2 6s. 4d. in favor of the latter rotation for a period of six years. If, however, we were to take into consideration net returns, and not gross ones, it is certain that the balance would be in favor of the longer rotation.

In conclusion, we may say that, whilst the Bare Fallow-Wheat-Pasture Rotation may not perhaps be able to show gross returns quite as good as those of the Bare Fallow-Wheat Rotation, the net returns or profits are likely to be quite as good, if not better. On theoretical grounds, too, it may be assumed that this form of rotation, by periodically restoring to the land the humus it loses in the bare-fallowing process, is better calculated to maintain the land in good heart than is the case in other rotations in which no grazing period intervenes. It should be added that wherever this form of rotation is adopted, one is not compelled to place exclusive reliance on the adventitious weed growth which may spring up on the wheat stubbles. These stubbles may be broken at very little expense in the early autumn on a shallow furrow, or merely by a suitable cultivator, and sown to rape, vetches, or any other fast-growing winter forage crop; or else, with equal advantage, a few pounds of lucerne, broadcasted behind the wheat drill and lightly harrowed in, will not only enhance the grazing value of stubbles, but will also materially improve the stock-carrying capacity of the special pasture year.

NEW TYPES OF ROTATION.

We have now completed our examination of the types of rotation illustrated in the plots of the Permanent Experiment Field. We are conscious, however, that such illustrations as have been fixed upon are very far from doing justice to this very important question; we are aware that they call for both extension and variation. We have determined, therefore, for the future, to extend our experimental work in this direction as much as circumstances permit of. We cannot help stating that the work involved is already fairly heavy, and can only be added to by degrees; it cannot, however, be extended beyond the means at our disposal. For the coming season we have already made provision for the two following types of rotation:—

A.

1. Bare Fallow.
2. Wheat.
3. Barley,
and

B.

1. Bare Fallow.
2. Wheat.
3. Pease or other Leguminous
Forage Crop.
4. Wheat.
5. Barley.

The first type represents a three-course rotation of which we made frequent use on the ordinary fields of the College Farm; the second is a five-course rotation, which appears to us to promise well for local conditions. Later on, we hope to find ourselves in a position to introduce such other illustrations of rotation as appear to us to present any local merit.

THE INFLUENCE ON PASTURE OF HEAVY OR LIGHT DRESSINGS OF PHOSPHATIC MANURES APPLIED TO THE WHEAT CROP.

There is no doubt that within recent years the live stock carrying capacity of South Australian farms has been very considerably increased, and this without the aid of special forage crops or artificial feeding in any shape or form. In this connection, we wish to recall the fact that special prominence was given to this question two or three years ago in reports dealing with the live stock reared and fattened on the College Farm. We believe that it can be stated without exaggeration that an average farm of the Lower North will, under careful management, carry comfortably three and four times as many sheep as would be the case were it no more than a portion of an ordinary station; this enhanced stock-carrying capacity has been attributed—and in our opinion rightly so—to the now almost universal practice of regularly dressing the wheat crop with superphosphate. As an immediate consequence of this practice, the stubble herbage has invariably proved more abundant, more nutritious than of yore. Specially noteworthy, too, has been the free development of leguminous plants; so much so, indeed, that “clovers” appear to have sprung up spontaneously in fields in which hitherto their presence had been not even suspected. There is no doubt, too, that this increased stock-carrying capacity of our farm lands must in the end react favorably on their general fertility or crop-carrying capacity. For increased stock-carrying capacity implies in the fields increased animal droppings and excreta; whence an increased accumulation of humus, of which our soils are being gradually but surely depleted by the constant practice of bare fallow.

These facts are now so generally admitted, and indeed acted upon, as to stand in no further need of experimental demonstration. Connected with them, however, there arises a more or less debatable point that is not without practical interest. We, on the Roseworthy Agricultural Farm, have always maintained that the present remarkable stock-carrying capacity of our fields, is attributable mainly to the continuous use of relatively heavy dressings of superphosphate. In effect, for many years past, it has been our invariable practice to dress regularly all wheat crops, not grown for purely experimental purposes, with 2cwt. of superphosphate to the acre. Our argument has been—and we see no reason to modify our opinions in this direction—that if at times our wheat yields have not been altogether proportional to the liberality with which we have dressed the crop with superphosphate, we have always

ultimately reaped the benefit of this treatment in a very much enhanced stock-carrying capacity of whatever fields were left out as pasture; indeed, our general experience would appear to point to the fact that it is not until a field has come repeatedly under the influence of heavy dressings of superphosphate that it responds freely and unmistakably in greatly increased herbage production. It might almost be stated that from the purely pasture point of view, land is not truly in "good heart" until it has come under the influence of at least ten years' cropping, receiving in that interval a general aggregate of a ton of superphosphate. Of this fact we can adduce very good evidence from the present condition of the College Farm fields.

The present area of the College Farm is, roughly, about 1,790 acres; the original farm, purchased in 1882, was slightly over 600 acres. This area was extended gradually at the following periods:—187 acres were purchased in 1897; 217 acres in 1898; 215 acres in 1899; 175 acres in 1902; and 242 acres in 1909. None of the additional fields have carried 10 crops since their purchase; and none of them in any way approach the carrying capacity of the fields of the old original farm. At the same time it must be admitted that this stock-carrying capacity of theirs already shows signs of marked improvement, particularly that of the earlier purchased fields.

When, in 1904, the lines of inquiry to be followed in the Permanent Experiment Field were first determined upon, it was thought that this question of the influence on pasture of light and heavy dressings of superphosphate was well worthy of definite investigation; accordingly 12 two-acre plots were set aside for the purpose. These plots were arranged in four groups of three, so that every year there might be represented in each group one plot under wheat, another treated as bare fallow, and another as pasture. The wheat plot of the first group was always to be dressed with $\frac{1}{2}$ cwt. of superphosphate, that of the second group with 1 cwt. of superphosphate, that of the third group with 2 cwts. of superphosphate, and that of the fourth group with 3 cwts. of superphosphate. And it is thus that we can now show every year in the Permanent Experiment Field pasture plots following wheat, dressed respectively with $\frac{1}{2}$ cwt., 1 cwt., 2 cwts., and 3 cwts. of superphosphate. The carrying capacity of these fields is measured by the number of sheep they are able to support throughout the pasture year; and it should be added that the general progress of the sheep is watched by periodical weighings.

The records of these plots might be supposed in the course of time to yield a definite answer to the problem we had in view, and so, as we shall have occasion to show shortly, in a measure they do. There is, however, one disturbing factor that had originally been overlooked, the Permanent Experiment Field, chosen for the purpose because of its convenience and the general uniformity of its soil, forms, unfortunately, part of the old original farm purchased in 1882, and had, therefore, prior to 1905, been heavily dressed with superphosphate throughout; hence, from a pasture point of view,

the whole of this field was already in "good heart" in 1905, and the differences between the carrying capacity of the several plots could not be expected to be as marked as would have been the case had newer land been selected. To obviate this difficulty we have, therefore, established duplicate two-acre plots in one of the fields purchased in 1909, which we know never to have received much superphosphate at the hands of its former proprietor. In this field we have added to the series a fifth group, in which the wheat crop will remain permanently unmanured. Results from these plots, however, will not be available for some years to come.

We have summarised below in Table XXIV. the grazing results on these pasture plots from 1906 to 1909. We have omitted the 1-cwt. plot, details concerning which have already been given higher up in Table XXIII.

TABLE XXIV.—*Showing Grazing Results on Pasture following Wheat Dressed respectively with $\frac{1}{2}$ cwt., 1cwt., 2cwts., and 3cwts. of Superphosphate, 1906-1909.*

Year.	Days Grazing.	Sheep per Acre.	Equivalent Sheep per Acre per Annum.	Value of Grazing at 15s. a Sheep.
PASTURE AFTER $\frac{1}{2}$ CWT. OF SUPERPHOSPHATE.				
1906	125	9.31	3.19	£ s. d. 2 7 10
1907	124	6.79	2.31	1 14 8
1908	118	6.17	1.99	1 9 10
1909	123	9.30	3.13	2 6 11
Means.....	123	7.89	2.66	1 19 10
PASTURE AFTER 2CWTS. OF SUPERPHOSPHATE.				
1906	107	10.82	3.17	£ s. d. 2 7 7
1907	124	6.85	2.33	1 14 11
1908	172	6.94	3.27	2 8 7
1909	115	11.42	3.60	2 14 0
Means.....	130	9.01	3.09	2 6 3
PASTURE AFTER 3CWTS. OF SUPERPHOSPHATE.				
1906	83	18.30	4.16	£ s. d. 3 2 5
1907	111	6.92	2.10	1 11 6
1908	174	6.59	3.14	2 7
1909	117	11.47	3.68	2 15 2
Means.....	121	10.82	3.27	2 9 1

Thus, then, Tables XXIII. and XXIV. may briefly be summarised as follows:—Over a period of four seasons (1906-09) the average sheep-carrying capacity of each plot was eventually represented for pasture—

After $\frac{1}{2}$ cwt. of superphosphate by 2.66 sheep per acre per annum

" 1	"	"	3.01	"	"
" 2	"	"	3.09	"	"
" 3	"	"	3.26	"	"

It cannot be said that the differences between the several plots amount to anything very considerable; indeed, except in the difference separating the $\frac{1}{2}$ -cwt. plot from the 1-cwt. plot, unless the cost of the excess of superphosphate used has been already paid for in an increased wheat yield, the heavier dressings cannot be said to have proved profitable. It should not be forgotten, however, that this field, as has already been pointed out, was certainly heavily dressed with phosphatic manures very frequently between 1882 and 1905.

Apart altogether from the relative merits of heavy and light dressings of superphosphate, attention may be drawn to these plots as affording a striking illustration of the high stock-carrying capacity of ordinary farm pasture in this district. A sheep-carrying capacity in excess of three per acre per annum, represents, in our opinion, about four to five times the carrying capacity of similar land worked on ordinary station lines.

EFFECT OF HEAVY AND LIGHT DRESSINGS OF SUPERPHOSPHATE ON THE WHEAT CROP.

The plots which have served to illustrate the influence of heavy and light dressings of superphosphate on pasture land, will serve also to show their influence on the wheat crop. We summarise below in Table XXV. the results of six seasons (1905-10).

TABLE XXV:—*Showing Results on Wheat Crops of Heavy and Light Dressings of Superphosphate, 1905-10.*

Year.	Plot.	Total Produce			Grain		Straw to	Bushel
		per Acre.			per Acre.		60lbs. of Grain.		Weight.
HALF-HUNDREDWEIGHT PLOTS.								
		tons	cwts.	lbs.	bush.	lbs.	lbs.	lbs.
1905 ...	16	2	14	88	28	23	152	63
1906 ...	15	2	6	3	19	14	208	58½
1907 ...	14	1	3	21	16	24	98	63½
1908 ...	16	2	7	50	27	32	133	63½
1909 ...	15	2	8	46	25	48	151	63
1910 ...	14	2	7	24	18	42	223	63½
Means..	—	2	4	57	22	46	161	62½
ONE-HUNDREDWEIGHT PLOTS.								
1905 ...	19	2	17	4	29	19	158	62
1906 ...	18	1	17	46	17	46	176	59½
1907 ...	17	1	0	27	14	22	98	63
1908 ...	19	2	11	55	29	1	139	63½
1909 ...	18	2	10	56	26	37	152	62½
1910 ...	17	2	10	71	19	2	238	63½
Means..	—	2	4	62	22	41	160	62½

TWO-HUNDREDWEIGHT PLOTS.							
Year.	Plot.	Total Produce per Acre.			Grain per Acre.		Straw to 60lbs. of Grain.
		tons.	cwts.	lbs.	bush.	lbs.	Bushel Weight.
1905 ...	22	2	15	22	30	51	140
1906 ...	21	2	2	7	20	4	175
1907 ...	20	0	19	77	13	21	105
1908 ...	22	2	12	71	31	25	128
1909 ...	21	2	11	70	27	33	150
1910 ...	20	2	10	80	20	18	220
Means..	—	2	5	36	23	55	153.

THREE-HUNDREDWEIGHT PLOTS.							
1905 ...	25	2	18	108	28	52	169
1906 ...	24	2	4	18	22	57	155
1907 ...	23	0	18	12	12	5	108
1908 ...	25	2	14	74	32	53	126
1909 ...	24	2	19	74	29	38	164
1910 ...	23	2	2	15	17	39	207
Means..	—	2	6	31	24	1	155.

Again, the differences between the average yields are very slight, not sufficient on the whole to cover the cost of the extra manure used. We summarise below the money value of the average crops, taken either as hay at 30s. a ton or as wheat at 3s. 6d. a bushel.

TABLE XXVI.—*Showing Money Value of Average Crops, either as Hay or Wheat, at Recent Ruling Rates (1905-10).*

Superphosphate Used.	Average Hay Yield.			Value of Hay at 30s. a Ton.		Average Grain Yield.		Value of Grain at 3s. 6d. a Bushel.	
	tons	cwts.	lbs.	£	s. d.	bush.	lbs.	£	s. d.
1 cwt.	2	4	57	3	6 9	22	46	3	19 8
1 "	2	4	62	3	6 10	22	41	3	19 5
2 "	2	5	36	3	8 8	23	56	4	3 11
3 "	2	6	31	3	9 4	24	1	4	4 1

Thus it will be seen that in no case has the value of the extra manure been recovered so far as the average results of these six seasons are concerned.

THE "GRAINGER" SUPERPHOSPHATE TESTS.

We have already stated that the plots that we have been considering have been reproduced in duplicate in one of the fields of a recently purchased farm, known as "Grainger's." These fields we know to have been dressed with only very moderate quantities of superphosphates during recent years. The first yields from these plots, viz., the 1910 yields, are available, and as they bear directly on the questions we have been discussing we reproduce the recorded data below.

TABLE XXVII.—*Showing 1910 Returns from Heavy and Light Dressings of Superphosphate on "Grainger" Plots.*

Treatment.	Total Produce. per Acre.			Grain per Acre.	Straw to 60lbs. of Grain.	Bushel Weight.
	tons	cwts.	lbs.	bush.	lbs.	lbs.
No manure	1	7	47	15	20	140
$\frac{1}{2}$ cwt. super.	1	13	13	21	43	111
1cwt. "	1	18	38	22	45	129
2cwts. "	2	0	61	22	15	144
3cwts. "	2	0	64	22	14	144

We summarise below the money value of these returns either as hay at 30s. a ton or as wheat at 3s. 6d. a bushel.

TABLE XXVIII.—*Showing Money Value of 1910 Returns of "Grainger" Plots.*

Treatment.	Value as Hay at 30s. a Ton.			Value as Grain at 3s. 6d. a Bushel.			Cost of Manure.
	£	s.	d.	£	s.	d.	s. d.
No manure	2	1	2	2	13	8	—
$\frac{1}{2}$ cwt. superphosphate	2	9	8	3	16	0	2 0
1cwt. "	2	17	6	3	19	8	4 0
2cwts. "	3	0	10	3	17	11	8 0
3cwts. "	3	0	10	3	17	10	12 0

We see, therefore, that the 1910 returns from the new "Grainger" superphosphate plots correspond fairly closely with the average of six seasons' returns in the Permanent Experiment Field. It will be noted that the hay yields show progressive increases with every addition of manure. These increases, however, illustrate the law of diminishing returns to the extent that whilst important and profitable at first with the heavier dressings the cost of the manure swallows up all profit that might appear to have been derived from their use. Thus the $\frac{1}{2}$ -cwt. plot shows a profitable increase over the no manure plot to the extent of 6s. 6d. an acre; and the 1-cwt. plot a profitable increase over the $\frac{1}{2}$ -cwt. plot of 5s. 10d. an acre. The increase of the 2-cwt. plot over the 1-cwt. plot is not sufficiently great to cover the additional cost of the manure. Finally, there is no perceptible difference in the hay yield of the 3-cwt. plot over that of the 2-cwt. plot.

If, on the other hand, we take the grain yields of the plots, we find the $\frac{1}{2}$ -cwt. plot showing a profitable increase of 20s. 4d. over the no manure plot; and the 1-cwt. plot a profitable increase of 1s. 8d. over the $\frac{1}{2}$ -cwt. plot; whilst relatively to the 1-cwt. plot there are losses on both the 2-cwt. and the 3-cwt. plots.

Before leaving these experiments we wish to draw special attention to the no manure plot yields, represented by 15bush. 20lbs. of grain or 1 ton 7cwts. 47lbs. of hay. We are dealing here with land that had been under wheat for a number of years, and dressed with superphosphate very lightly within quite recent times. These yields tend to show, we believe, how mistaken was the view that held that the fertility of Australian soils was so slight

as to lead to its complete exhaustion by a few unmanured wheat crops. In our opinion the early failures that followed on the rapid destruction of the virgin condition of the land are to be attributed to lack of skill in handling land rather than to any marked exhaustion of the soil; in other words, general farming practice suited to local conditions is better understood to-day than was the case formerly.

THE NITRATE PLOTS.

These plots were established with a view to ascertaining the value or otherwise of nitrate of soda upon wheat grown after bare fallow. With this object in view the plots were arranged as follows:—

Plots 26 and 27, alternately under bare fallow and under wheat grown continuously without manure.

Plots 28 and 29, alternately under bare fallow and under wheat dressed regularly with 2cwts. of superphosphate to the acre.

Plots 30 and 31, alternately under bare fallow and under wheat dressed regularly with 2cwts. of superphosphate, and 1cwt. of nitrate of soda broadcasted immediately after seeding, to the acre.

Plots 32 and 33, alternately under bare fallow and under wheat dressed regularly with 2cwts. of superphosphate, and 1cwt. of nitrate of soda broadcasted in the spring, to the acre.

The returns of the past six seasons are summarised below.

TABLE XXIX.—*Showing Returns from Nitrate Plots, 1905-1910.*

Year.	Plots.	Total Produce per Acre.			Grain per Acre.		Straw to 60lbs. of Grain.	Bushel Weight.
NO MANURE PLOTS.								
		tons cwt. lbs.			bush. lbs.		lbs.	lbs.
1905	27	2	1	37	25	18	123	63
1906	26	1	16	35	18	30	160	61½
1907	27	1	0	102	15	52	88	63½
1908	26	1	11	19	25	4	79	64½
1909	27	1	17	24	23	32	117	61½
1910	26	1	17	88	18	7	174	64½
Means...	—	1	14	14.	21	4	124	63
TWO HUNDREDWEIGHTS OF SUPERPHOSPHATE PLOTS.								
1905	29	3	3	107	32	12	162	63
1906	28	2	1	64	20	48	164	58½
1907	29	1	7	108	20	48	91	63½
1908	28	2	9	58	29	27	128	64
1909	29	2	9	66	28	1	138	62½
1910	28	2	12	65	24	53	176	63½
Means...	—	2	7	59	26	2	143	62½

TWO HUNDREDWEIGHTS OF SUPERPHOSPHATE, AND 1CWT. OF NITRATE OF SODA AT SEEDING.

Year.	Plots.	Total Produce. per Acre.			Grain per Acre.		Straw to 60lbs. of Grain.	Bushel Weight.
		tons	cwts.	lbs.	bush.	lbs.	lbs.	lbs.
1905	31	3	4	107	36	1	142	62
1906	20	2	3	44	22	27	156	58
1907	31	1	8	95	20	29	98	63
1908	20	2	15	8	33	26	124	64
1909	31	3	2	61	34	45	141	63½
1910	30	2	16	22	25	48	184	62½
Means...	—	2	11	96	28	49	141	62½

TWO HUNDREDWEIGHTS SUPERPHOSPHATE, AND 1CWT. NITRATE OF SODA IN THE SPRING.

1905	33	2	19	62	34	26	134	63½
1906	32	2	5	14	23	32	155	58
1907	33	1	5	51	19	31	86	63
1908	32	2	16	97	32	34	136	64
1909	33	3	6	95	36	46	144	63
1910	32	2	12	62	23	24	192	62½
Means...	—	2	11	8	28	22	141	62½

We append below the money value at ruling rates of the average returns of these plots both as hay and grain.

TABLE XXX.—*Showing Money Value of Average Nitrate Plots, 1905-10.*

Treatment.	Value as Hay at 30s. a Ton.		Value as Grain at 3s. 6d. a Bush.		Cost of Manure. s. d.
	£	s. d.	£	s. d.	
No manure	2	11 2	3	13 9	—
2cwts. superphosphate.....	3	11 3	4	11 1	8 0
2cwts. super., and 1cwt. nitrate of soda at seedtime	3	17 7	5	0 10	22 0
2cwts. super., and 1cwt. nitrate of soda in the spring	3	16 7	4	19 3	22 0

We wish, in the first place, to draw attention to the no-manure plots. It will be noted that the average yield of six successive seasons (1905-10) for wheat grown continuously without manure, but alternating with bare fallow, is represented by 21bush. 4lbs.; that both the 1909 yield (23bush. 32lbs.) and that of 1910 (18bush. 7lbs.) were obtained from wheat grown on the same land for the third time in succession without manure of any kind. Our experience is that in the district in which we are situated unmanured crops always show up well relatively to manured ones in seasons that are relatively moist and late; and it is only in dry, early seasons that phosphatic dressings show to very great advantage at harvest time. On the other hand, in the earlier stages of growth the manured crop almost invariably outstrips the unmanured one; hence, in our view, the chief advantage attaching to the use of soluble phosphatic manures in relatively dry, hot districts is represented on the one hand by the magnificent start they invariably give to the young crop, and on the other by their influence in appreciably shortening the period of active growth of the crop. It follows

that, it may be stated without exaggeration, a crop treated with superphosphate will thrive on a lower rainfall than an unmanured crop; hence, again, under our conditions of climate an unmanured crop, when compared with one that has been dressed with superphosphate, may be said to act like a wheat of a later variety, which in early seasons is always apt to be caught by drought and heat before it can find time to come to complete development.

The fact that the average bushel weight of the no-manure plots is slightly higher than that of any of the manured plots should also be borne in mind.

In the plots dressed with superphosphate alone, straw and flag growth appears to have been affected to a greater degree than grain yield. This point is borne out by the fact that in the superphosphate plots the proportion of straw to a bushel of grain was represented in six years by an average of 143lbs., whilst that of the no manure plots was only 124lbs. We may note, too, that at ruling rates the average profitable increase of the superphosphate plots over the no manure plots was represented by 12s. 1d. an acre as hay and 9s. 4d. an acre as grain.

Of nitrate plots we have two sets, which should in the first place be compared one with the other. The fact that nitrate of soda is a very soluble manure, for which the soil shows no special retentiveness, is very well known; hence, in cold, wet countries, in which the stimulating influence of this manure is most marked, it is customary to broadcast it over winter-sown wheat in early spring, when the mean temperature begins to rise and winter wheats to quit their sprawling, grass-like habits. Indeed, in this connection, various experiments of Lawes and Gilbert showed very conclusively that, in England at least, nitrate of soda applied in the early winter is never as effective as nitrate of soda applied as a spring top-dressing; the fact is that heavy winter rains are apt to leach this soluble manure out of the soil at a time when in cold countries the root action of the wheat plant is very feeble, if not entirely suspended. South Australian conditions of climate differ essentially from those of England. With us the growth of the wheat crop, albeit somewhat slower in mid-winter, may be said to be practically continuous from germination onwards; hence it seems probable that nitrates should be availed of by the roots of plants fairly freely throughout the winter months. On the other hand, our spring rains are proverbially unreliable, and it may be questioned whether they can be depended upon in ordinary circumstances to bring about a perfectly satisfactory distribution through the soil of spring-sown nitrate of soda. It is on these grounds, therefore, that it was thought advisable to introduce into this series two sets of nitrate of soda plots. In the first set (plots 30 and 31) the nitrate of soda is broadcasted immediately after seeding and harrowed in; whilst in the second set of plots (32 and 33) the nitrate of soda is not broadcasted over the crop until early August. Curiously enough, the average returns of six seasons show the yields both of

hay and of grain to be almost exactly similar in these two sets of plots, with the advantage slightly on the side of the winter-broadcasted nitrate.

If, on the other hand, we take individual seasons we find the advantage to lie with winter-broadcasted nitrate of soda in 1905, 1907, 1908 and 1910; whilst a spring top-dressing of nitrate of soda proved more effective in 1906 and 1909. In no year, however, have the differences been very considerable. In a general way, the winter dressing may be recommended as best adapted to our conditions of climate.

We may now proceed to discuss the general question of the apparent efficacy in this district of nitrate of soda applied to a wheat crop after bare fallow. It will be noted that in these plots no attempt has been made to grow wheat dressed exclusively with nitrate of soda; in each case this manure has been associated with a normal dressing of superphosphates. Indeed, general experience having conclusively proved that our soils respond invariably to the action of phosphatic dressings, any attempt to test the efficacy of nitrates independently of superphosphate would represent mere waste of time; hence the plots dressed with nitrate of soda must be compared with those dressed with superphosphate alone.

If we take, in the first place, the average yields of the six seasons we see that in total produce or hay the superphosphate plots were exceeded by the nitrate plots by 4cwts. 37lbs. and 3cwts. 61lbs. respectively; that in grain yields they were exceeded by the nitrate plots by 2bush 47lbs. and 2bush. 20lbs. respectively.

If next we take individual years we find that where nitrate soda had been broadcasted immediately after seeding the total produce or hay yield was invariably heavier than was the case on the plots dressed with superphosphate alone; whereas the grain yield was slightly inferior on one occasion only, viz., in 1907.

Where nitrate of soda was broadcasted in spring we find the total produce or hay yields superior to those of the superphosphate plots in 1906, 1908, 1909; the yield was equal in 1910, but inferior in 1905 and 1907. The nitrate grain yields, on the other hand, were superior to those of the superphosphate plots in four seasons out of six; inferior to them in 1907 and 1910.

There can be no doubt, therefore, that in the past six years Roseworthy soils have responded in an unmistakable manner to the action of soluble nitrogenous manures, particularly when the latter have been applied immediately after seeding. A careful examination of the results will serve to show that 1907 was the year in which nitrate of soda proved the least effective; and that year, as we have already had occasion to remark, was characterised by a winter and spring both equally dry, in which, therefore, it may be assumed that the nitrates did not find a sufficiency of moisture to bring about their complete diffusion through the soil.

On the other hand, the differences in favor of the nitrate plots were greatest in 1909, viz., an excess over the purely superphosphate plots of 6bush. 44lbs. and 8bush. 45lbs. of grain, and 13 and 17 $\frac{1}{4}$ cwts. of hay to the acre respectively. This was one of the most favorable cereal years we have yet experienced—a magnificent winter followed by a magnificent spring; and, as we perceive, the nitrates had free scope for their action.

ON THE APPARENT ACTION OF NITRATE OF SODA ON CEREAL CROPS.

Before referring to the profitableness or otherwise of nitrate of soda as a manure in this district we wish to point to an aspect of the question in which our results are apparently at variance with what is usually described as European experience. We are frequently told in the text-books, supported by definite experimental work, that nitrogenous manures stimulate the vegetative rather than the fruit-bearing powers of cereals; that the grain increase for which they are responsible is rarely proportional to the straw and flag increase that may be traced to their influence; and that when present in any excess they appear to exercise a generally retarding influence on vegetation, which under our conditions of climate must always prove more or less detrimental. Let us now examine what has been our experience here.

We have already seen that relatively to the no-manure plots the superphosphate plots show a greater increase of straw, chaff, and flag than of grain; that whilst in the no-manure plots the relation of straw to a bushel of grain was represented by 124lbs., in the superphosphate plots it had risen to 143lbs. This relationship admits of being expressed in another way; thus, whilst in six seasons 2cwt. of superphosphate had the effect of increasing the total produce of hay yield by 39.27 per cent. it raised the grain yield by only 23.57 per cent.

On the other hand, in the six seasons under review, when to the 2cwts. of superphosphate 1cwt. of nitrate of soda has been added, we find the proportion of straw, chaff, and flag to a bushel of grain to be represented by 141lbs.; i.e., 2lbs. less than in the case of plots dressed with superphosphate alone. From another point of view the addition of 1cwt. of nitrate of soda has had the effect of raising the total produce or hay yield by 9.11 per cent. above that of plots dressed with superphosphate alone, and the grain yield by 10.69 per cent. It must be clear, therefore, that with us nitrate of soda has not stimulated straw and flag growth at the expense of grain yield. At the same time, it should be stated that throughout these years the plots dressed with nitrate of soda have at all events had the appearance of greater luxuriance of growth, with characteristic deep blue-green foliage. These plots, too, have shown a greater tendency to being lodged by rough weather. It should be noted that the average bushel weight of the nitrate plots is about $\frac{1}{2}$ lb. below that of the purely superphosphate plots.

INFLUENCE OF NITRATE OF SODA ON VEGETATION AND RIPENING OF WHEAT CROP.

Nor has it been our experience that a dressing of nitrate of soda has a retarding influence on the general vegetation and ripening of the crop; indeed, as results in Table XXXI. would tend to show, the reverse is rather the case. We have indicated in this table below the dates of germination, full bloom, and ripening of these four sets of plots; we have also shown the number of days elapsing between each period. It should be added that the figures bear reference to an early wheat of our own—King's White.

TABLE XXXI.—*Showing Periods of Vegetation and Ripening of Plots in Nitrate Series, 1905-10.*

	No Manure Plots.					2cwt. Superphosphate Plots.				
	Germinated.	In Full Bloom.	Number of Days.	Ripe.	Total Days.	Germinated.	In Full Bloom.	Number of Days.	Ripe.	Total Days.
1905.....	—	—	—	Nov. 27	—	—	—	—	Nov. 24	—
1906.....	May 25	Oct. 9	137	Dec. 1	190	May 26	Oct. 9	136	Nov. 30	188
1907.....	May 21	Sep. 30	132	Nov. 23	186	May 24	Sep. 29	128	Nov. 23	183
1908.....	June 11	Oct. 16	127	Nov. 21	163	June 11	Oct. 12	123	Nov. 16	158
1909.....	June 3	Oct. 20	139	Dec. 2	182	June 2	Oct. 17	137	Dec. 2	183
1910.....	May 29	Oct. 5	129	Nov. 26	181	May 30	Oct. 2	125	Nov. 25	179
Means ...	—	—	135	—	180	—	—	130	—	178

	2cwts. Superphosphate, and 1cwt. Nitrate of Soda at Seeding.					2cwts. Superphosphate, and 1cwt. Nitrate of Soda in Spring.				
	Germinated.	In Full Bloom.	Number of Days.	Ripe.	Total Days.	Germinated.	In Full Bloom.	Number of Days.	Ripe.	Total Days.
1905.....	—	—	—	Nov. 24	—	—	—	—	Nov. 24	—
1906.....	May 28	Oct. 1	126	Nov. 23	179	May 28	Oct. 1	126	Nov. 23	179
1907.....	May 25	Sep. 30	128	Nov. 18	177	May 25	Oct. 1	129	Nov. 18	177
1908.....	June 12	Oct. 8	118	Nov. 16	157	June 12	Oct. 8	118	Nov. 18	169
1909.....	June 1	Oct. 13	134	Nov. 22	174	June 1	Oct. 13	134	Nov. 29	181
1910.....	May 30	Oct. 2	125	Nov. 22	176	May 30	Oct. 2	125	Nov. 22	176
Means ...	—	—	126	—	173	—	—	126	—	174

We see here that in the no manure plots between germination and the time of full bloom 135 days have on the average elapsed, and 180 days between germination and ripening; for the superphosphate plots we have 130 and

178 days respectively ; and for the nitrate plots 126 and 173 days respectively. It cannot be said, therefore, that a dressing of nitrate of soda has in any way retarded the vegetation of the wheat crop ; on the contrary, it appears to have caused the wheat to develop and mature more rapidly.

ARE THE INCREASED YIELDS SECURED ON THE USE OF NITRATE OF SODA PROFIT-BEARING ?

It is one thing to show that increased yields may be secured by the use of nitrate of soda, and another to show that the latter leave to the user a satisfactory margin of profit. It is to be feared that whether taken as hay or as grain the average increases in yield that have been indicated are not at present rates sufficiently high to pay for the cost of the manure used.

Thus Table XXX. shows the average value of the superphosphate plots taken as hay to be represented by £3 11s. 3d. and taken as grain by £4 11s. 1d. ; similarly, the average hay value of the plots treated with nitrate of soda is represented by £3 17s. 7d. and the average grain value by £5 0s. 10d. This leaves us differences in favor of the nitrate of soda plots of 6s. 4d. and 9s. 9d. an acre respectively. Now, in South Australia, nitrate of soda is a present worth £14 a ton ; and as 1 cwt. of nitrate of soda to the acre was the dressing made use of it will be evident that the average increases have failed to pay for the cost of the manure used ; nor, indeed, would they have paid for it at the ruling English prices of £9 10s. to £9 17s. 6d. a ton.

Had the average increases been equal to those secured in 1909, namely, in the case of one plot, 17½ cwt. of hay and 8 bush. 45 lbs. of grain, or 25s. 10d. and 30s. 7d. respectively, these increases would not only have paid for the cost of the manure, but left us a handsome profit as well.

We have good reason for believing that results almost equally satisfactory could have been obtained with lighter dressings of nitrate of soda ; we propose, therefore, in future years, having a new pair of plots in which a dressing of only ½ cwt. of nitrate of soda will be made use of. We shall have occasion to show later on that a dressing of ½ cwt. of nitrate of soda has been without much appreciable effect.

(To be continued.)



LIVE STOCK IN 1910.

GOVERNMENT STATIST'S REPORT.

The return published herewith shows the live stock in the various divisions of the State on the 31st December, 1910, in comparison with the previous year.

The year was a most favorable one for all stock, and substantial increases are recorded in every line with the exception of sheep.

STRENGTH OF FLOCKS.

Cattle.—384,862 (344,034); increase, 40,828. Dairying cattle show a total increase of 8,871, distributed among the divisions as follows:—Central, 2,865; Lower North, 483; Upper North, 2,584; South-Eastern, 2,158; Western, 450; and remainder of State, 331.

Horses.—249,326 (230,405); increase, 18,921. Light horses show an increase of 4,704; draughts, 14,002; and entires, 215.

Sheep.—6,267,477 (6,432,038); decrease, 164,561. The flocks outside the counties numbered 981,332, an increase of 76,677 on the previous year, but those within counties decreased to the extent of 241,238. While the season was a splendid lambing one, the number marked was not nearly sufficient to maintain the strength of the flocks and also provide for the continued heavy slaughterings for home consumption and export and the lessening of the flocks through the ravages of dogs, foxes, natural, and other causes. If our flocks are to increase it is certain that more ewes must be put to ram. In some districts the decrease may be attributable to the increase in cattle and horses, the grazing capacity of the combined increase under these two heads being equal to over 500,000 sheep.

Pigs.—96,386 (80,410); increase, 15,976. As the dairying industry shows a substantial up-grade movement, an increase of pigs was to be naturally expected. The improvement is better than indicated by the increase, because many thousands were slaughtered during the year in excess of the previous year.

Goats.—14,403 (13,349); increase, 1,054. Of this number 3,450 are described by the owners as Angoras.

Other Stock.—6,570 (5,565); increase, 1,005. The following kinds are included under this heading:—Camels, 2,870 (2,358); mules, 813 (647); donkeys, 1,536 (1,303); and ostriches, 1,286 (1,199).

DECENNIAL INCREASE (1901-1910).

During the last decade the following increases have taken place in the flocks:—

Cattle.—159,606, of which 44,633 were milk cows; *horses*, 84,023; *sheep*, 1,255,261; *goats*, 5,534; *pigs*, 7,500.

SLAUGHTERINGS.

For home consumption and export:—

Sheep and lambs, 1,316,388 (1,303,500); *cattle*, 84,164 (82,445); *pigs*, 76,308 (70,027).

STOCK PER SQUARE MILE IN EACH DIVISION, 1910.

Division of State.	Area in Square Miles.	Horses Per Square Mile.	Cattle Per Square Mile.	Sheep Per Square Mile.	*All Kinds in Terms of Sheep per Square Mile.
Central	13,891	6.99	7.62	89.65	235.74
Lower North	12,401	4.48	3.76	102.83	185.23
Upper North	14,065	1.94	4.71	57.28	123.77
South-Eastern	15,585	2.02	3.53	90.78	146.30
Western	26,161	.78	.56	20.84	34.18
Outside Counties	297,967	.06	.32	3.29	7.12
Total South Aus- tralia Proper { 1910 } { 1909 }	380,070	{ .66 .61	{ 1.01 .91	{ 16.49 16.92	{ 33.18 32.04

* For this purpose each horse or head of cattle equals 10 sheep.

MORTALITY.

Sheep.—The losses reported as due to dogs and foxes were considerably less than the previous year, the number being 73,574, against 94,938.

Cattle.—Losses, 7,714 (11,023); decrease, 3,309. Of this number 664 deaths were attributed to dry bible, against 2,173 of the previous year.

Horses.—Losses, 5,593 (5,687); decrease, 94.

AGRICULTURE IN OTHER LANDS.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College.

SPAIN.

(Continued from page 1061.)

MALAGA.

We left Seville for Malaga on October 23rd. In the early stages of the journey one passes in review a never-ending procession of olive trees. The visible horizon is crowded with them; in the plains and on hill-slopes, in poor-looking country quite as much as in fertile-looking tracts. These trees, however, begin to thin out and finally disappear altogether as we ascend into higher regions. The approach to Malaga itself is as picturesque as it is unexpected; from precipitous recesses we glide down on easy gradients to the sea-beach. First we penetrate the wild gorge of Hoyo de Chorro, and are soon threading an endless labyrinth of tunnels, whilst in the intervals of daylight we are vouchsafed glimpses of desolate mountain scenery, gigantic boulders and sheer cliff faces overhanging chasms and far distant torrents; and then suddenly, as by enchantment, bursts to view the tropical luxuriance of the Hoyo de Malaga. Well down to the sandy beach the railway line is now bordered by an entangled growth of oranges, palms, pomegranates, figs, vines: a wonderful sight after the bleak grimness of the mountain passes.

In Malaga we did not tarry long, for neither general accommodation nor the town itself are altogether in keeping with the wild beauty of the surroundings. Malaga appears to be both a thriving seaport and an important industrial centre, in which neither the gospel of cleanliness nor general sanitary science appear to have made much headway, and the condition of streets and highways at this time of the year is the reverse of pleasant after the fall of the merest shower of rain. The general climate, however, is said to be ideal over the greatest portion of the year; and I can well imagine that such should be the case, although the fact that sugar-cane thrives in the vicinity would appear to suggest a certain degree of atmospheric oppressiveness at certain periods of the year.

Malaga has long been celebrated for the quality of its sweet wines, which the lapse of centuries has in no way impaired, albeit they are of the type

that appeals more to the Latin than to the Anglo-Saxon palate. Within recent years, unfortunately, the unchecked ravages of the phylloxera have done much towards curtailing a once extensive vineyard area, and the wine output of Malaga is no more what it was some 20 or 30 years ago. Equally celebrated, and with good reason, are the Malaga table raisins; I do not recollect seeing anything finer of their kind. The getting-up of these raisins for sale, so as to show them off to best advantage, is no neglected art here, nor did I meet with any attempts at the deliberate concealment of second-class and inferior fruit beneath surface layers of choicer description. Whatever was described as first-class I found to be first-class from top to bottom; experience shows that such is not always the case elsewhere.

The gardens of Malaga appear to revel in luxuriance; at the time, however, they presented a somewhat unkempt appearance which, on the whole, is perhaps characteristic of autumn gardens all the world over. To my regret time did not permit of my making extensive inquiries into the agricultural methods of this most interesting strip of country.

GRANADA.

On October 25th we left Malaga for Granada, and soon found ourselves back again in the region of olive trees. We traverse some extensive and very well kept groves belonging to the Duke of Wellington, a gift from the Spanish nation to his illustrious ancestor of Peninsula war fame. As one approaches Granada one realises how much more thorough are general cultural operations here than anywhere else in Spain. The valley, or Vega de Granada, is very extensively irrigated and given up almost entirely to the cultivation of sugar-beet; and with very good reason, if I was correctly informed, since at present rates sugar-beet growing is said to return 10 per cent. on invested capital. The extent to which within recent years this crop has come to monopolise the district may be gauged by the fact that there are now 16 large sugar-beet factories in full working order in the Vega. I had occasion to look over one of these factories at a time, however, when no work was being done. This factory appeared to me to be well equipped on modern lines and very well kept. Its yearly output was said to be represented by 75,000 bags of sugar of 132lbs. each.

I was curious to learn what was done in this district with sugar-beet residues. In Northern France these residues were generally fed in the moist state to steers put up for fattening; special forms of disease have, however, I believe been traced to this method of using beet pulp. In this Spanish factory, after extraction of the sugar, the pulp is first partly dried by pressure and then transferred to specially-constructed kilns in which the drying process is completed with hot air. The dried pulp is then put in bags, going 75lbs. to 77lbs. each and sold as fodder to be fed either to horses, cattle, or sheep. The usual price realised is said to be about £3 15s. 6d. a ton.

I have already had occasion to point out that in this district sugar-beet growing is dependent wholly on irrigation; this, of course, tends to make of it a somewhat expensive crop, involving the use of much hand-labor. The latter, however, is extremely cheap, being remunerated, I was assured, at the miserable rate of 1s. 6d. a day. As yet no attempt appears to have been made to grow sugar-beet in rotation with some other type of crop suited to local conditions. The common practice appears to be to go on raising sugar-beet year after year on the same plot of land, helping the crop along by occasional dressings of stable manure and guano. In this connection I suppose we should not forget that in this district the sugar beet industry is a comparatively recent one, and that for Spain it has hitherto proved an unusually profitable one; hence we may readily assume that in this somewhat improvident country every landowner is intent on making hay while the sun shines without thought of the morrow. It seems highly improbable, however, on the experience of other countries, that even with the aid of irrigation growers will be able to continue indefinitely to draw from the soil, year in and year out, profitable crops of sugar-beet. At the present moment a good crop of irrigated sugar-beet is said to be represented in the Vega by 24 tons to 25 tons to the acre; the average yield of the district I was unable to ascertain. The roots are paid for by the factories on a quality test, much in the same way as our butter factories pay for milk. The juice of the roots is tested, and payment is made in proportion to its specific gravity, which will always correspond to its sugar contents. Payment is said to be made at the rate of 9d. for one-tenth of a degree of density (I was unable to ascertain what type of densimeter was in use). On an average this type of payment works out at £1 0s. 4d. to £1 5s. 8d. a ton of roots.

In Australia, wherever irrigation is made available, we usually fall back on lucerne and other forms of fodder that can be raised at little expense and fed to live stock. The idea of reducing labor to a minimum usually dominates our policy in this direction. It may well be questioned, however, whether in some special cases we might not find it to our interest to fall back on so profitable an undertaking as the sugar-beet industry over some of our irrigable districts. I am, of course, aware that the erection and equipment of sugar factories is a costly affair; not to be entered upon without some degree of certainty as to the success of the venture. Nevertheless, as Victoria did not hesitate to attempt sugar-beet raising without irrigation, why should not we test the matter with irrigation?

On the outskirts of the Vega I noticed that both olive trees and vines were occasionally irrigated.

THE SPANISH MULE.

Here, as indeed throughout Spain, the mule is the chief beast of burden and draught. The Spanish mule is on the whole a handsome beast, more attractive than the heavy French Poitou mules, although hardly as serviceable

for heavy draught purposes. He is of alert, active appearance, with well-bred head, clean lean limbs, and well-shaped feet; rather light in the bone perhaps, but without that abnormal abdominal development characteristic of the heavier types of draught mules. The coat is usually smooth and glossy. On the whole, judged by our standards, the Spanish mule is more of a pack animal, and better adapted to lorry or dray than to heavy wagon work. These characteristics he may be said to owe to his sire and dam respectively. The former—the Spanish jack—alert, high-bred, clean-cut, is in striking contrast to his shaggy, ungainly cousin, the Poitevin jack; whilst the latter—a Barbe mare for the most part—is considerably lighter than the French ideal “jument mulassiere.”

Teams abreast are no more in honor in Spain than anywhere else in the south of Europe. On the country roads and in the streets of towns are constantly to be seen large two-wheel vehicles, of greater carrying capacity than our ordinary drays, drawn by a string of four mules in Indian file; or not uncommonly three mules with a donkey in the lead. My earlier days had made me tolerably familiar with the various tasks it is customary to impose upon this humble beast of burden; never before, however, had I seen it in this novel position of comparative ease and dignity well out of reach of the punishing lash.

We have not taken kindly to mules in Australia; indeed, it is but rarely that one meets with them. And yet wherever one goes in the warmer regions of the globe one finds that for general purposes mules have been given the preference over horses. As draught animals if not as hacks they have many points in their favor: under adverse conditions of diet they are hardier than horses, they eat less, are less difficult in their tastes, less subject to disease and limb unsoundness, and they are generally longer lived. Against mules, on the other hand, it may be said that at times they are less tractable and staunch than the average horse, and in the popular mind, like all half-breeds, they are supposed to inherit all the defects of their parents and but few of their good points. Let us recognise, however, that the chief difficulty is the fact that the Anglo-Saxon does not love the mule, and unless in the future our immigrant increase be partly drawn from the South of Europe the mule, in spite of his numerous good qualities, is no more likely to become common in Australia than is the camel.

With all its squalor, its gipsies, its beggars, Granada is a wonderful city to visit. The interest attaching to it is mainly historical, for it is passing rich in the relics of glorious by-gone days. The Alhambra, that fairy Moorish palace overhanging the city and facing the snow-clad Sierra Nevada; the stately Alameda; the art treasures of the beautiful cathedral—one might have spent months of æsthetic enjoyment in the neighborhood but for the fact that time flies, and there was yet much to be done. And thus on the

evening of the 28th of October, after a stay all too brief, we set out on the return journey to Madrid.

TOLEDO.

Whilst in Madrid for the second time we paid a hasty visit to Toledo, a curious old Moorish town, still celebrated as of yore for its steel and damascene work. The city and its general surroundings are picturesque in the extreme, albeit the stern grandeur of its monumental buildings can hardly be appreciated from its narrow, tortuous streets. Toledo, which must have been almost impregnable in days of old, dominates the plain from the summit of rough-hewn granite rocks. Almost completely encircled by the steep cliffs of the Tagus, it presents a most threatening, gloomy appearance from the left banks of the river. Here, by the bridge of San Martín, I run into the only flock of Merinos I was able to come across in Spain. It was raining at the time, and the flock had halted in the neighborhood of the bridge under the protection of huge, wolf-like dogs, not unlike those I had seen similarly occupied in Greece some months back. These Merinos did not make a very brave show. They were no improvement on those pictures of the early unimproved Merinos that have been handed down to us by our forefathers. Long of limb, flat in the barrel, irregular in the backline, they were all that a sheep should not be. I cannot answer for the wool, as the sheep were too wet to be handled. I endeavored to secure some photographs of the flock, but weather conditions were too unfavorable for anything like success in this direction.

BARCELONA.

We left Madrid for Barcelona on the evening of October 31st. I tarried a day here as I wished to secure from the British Consul-General in this city, and from the Barcelona British Chamber of Commerce, information I had been unable to obtain in Madrid. Unfortunately I chanced on one of those numerous feast days, dear to the heart of the Spaniard. Public offices were all closed, and I had to fall back on published documents which the Consul was good enough to forward me. I was much struck with Barcelona; with its wide thoroughfares and its fine buildings, it is the most modern and least Spanish of the cities of Spain. It is by far the most important commercial and industrial centre of the Peninsula, and, it may be added concurrently, its most turbulent city. Barcelona boasts of about 550,000 inhabitants, most of whom are Catalans, many of whom do not even appear to understand Spanish. I was surprised to notice that everywhere in this city the names of the streets are always inscribed in two languages, Spanish and Catalan. The city itself is beautifully situated at the foot of the heights of Tibidabo, from the summit of which one enjoys magnificent panoramic views both towards the sea and the distant Pyrenees.

THE CEREALS OF SPAIN.

I have as yet said little of the cereals of Spain; and yet Spain, with all its other resources, may still be described as one of the great wheat-growing countries of the world. Unfortunately neither the time of the year nor the special localities that I visited were suited to inquiries in this direction. The following statistical data, however, will serve to show how great are the special cereal interests of the Spanish peninsula.

In 1907 the area under wheat in Spain was represented by 9,244,812 acres, and in 1908 by 9,391,803 acres. The total wheat harvest was represented by 100,121,241 bush. in 1907, and by 119,718,075 bush. in 1908, or general average yields per acre of 10·83 bush. and 12·64 bush. respectively. In the total area under wheat in 1908 are included some 503,030 acres of wheat that had been irrigated, and which yielded at the rate of 20·56 bush. to the acre, whilst the yield over the balance, or unirrigated area, was represented by 12·02 bush.

When we recollect that the total wheat harvest of the Commonwealth in 1908, an excellent year, did not exceed 62½ million bushels, we must realise the importance of wheat to the relatively small area of Spain, and the efforts we are called upon to make if we wish to produce wheat in quantities at all proportional to our vast territory.

Nor has Spain neglected the other cereals, as the figures below will serve to show—

Spanish Cereals other than Wheat in 1907 and 1908.

1907.			
Cereal.	Area in Crop. Acres.	Total Returns. Bush.	Yield per Acre. Bush.
Barley	3,602,862	51,346,170	14·25
Oats	1,200,362	13,570,034	11·30
Rye	2,254,222	25,135,994	11·15
Maize	1,122,482	23,630,306	21·05

1908.			
Cereal.	Area in Crop. Acres.	Total Returns. Bush.	Yield per Acre. Bush.
Barley	3,507,340	66,671,704	19·01
Oats	1,224,810	22,444,394	18·33
Rye	2,273,097	24,599,120	10·82
Maize	1,146,577	18,734,665	16·34

Leguminous crops, too, appear to be grown very extensively for their grain, as figures below show—

Leguminous Grain Crops in Spain.

1907.

Cereal.	Area, in Crop. Acres.	Total Returns. Bush.	Yield per Acre. Bush.
Kidney beans	634,372	4,324,500	6.82
Field beans	436,875	4,913,242	11.25
Chick peas	415,530	2,159,252	5.20
Vetches	173,410	1,302,554	7.51
Field peas	68,182	399,960	5.87
Lentils	31,902	209,510	6.57
Peanuts	18,755	672,503	35.86
Lupins	13,490	148,210	10.99

1908.

Cereal.	Area in Crop. Acres.	Total Returns. Bush.	Yield per Acre. Bush.
Kidney beans	641,345	3,978,931	6.20
Field beans	455,790	5,990,237	13.14
Chick peas	421,355	4,141,034	9.83
Vetches	159,303	2,132,966	13.39
Field peas	72,717	391,274	5.38
Lentils	37,142	428,472	11.54
Peanuts	18,875	502,150	26.60
Lupins	14,842	199,166	13.42

Additionally there were under carob trees in 1908 about 371,247 acres, which returned 86,452 tons of carob beans, or about 4 $\frac{1}{2}$ cwts. to the acre.

And yet, in spite of these returns, Spain is not a cereal-exporting country, nor apparently does local production come up to the food requirements of its 19 $\frac{1}{2}$ million inhabitants; Indeed, at the present moment there appears to be an outcry throughout the peninsula to the effect that wheat, and consequently the wheaten loaf, is higher priced in Spain than anywhere else in the world. It is stated that less than half a century ago wheaten bread was worth in Spain from 2 $\frac{1}{2}$ d. to 2 $\frac{1}{2}$ d. the 2lb. loaf, whereas present ruling rates vary between 3 $\frac{1}{2}$ d. and 4 $\frac{1}{2}$ d. the loaf; hence much of the bread consumed in some of the Spanish provinces is made from maize, imported very largely from the Argentine Republic. The following figures, collected for the British Chamber of Commerce at Barcelona during 1910, will serve to show that wheat has been higher in Spain than is the case in other parts of the world.

Average Price of Wheat on Various Markets in 1910.

	s.	d.	
Paris	5	5	a bushel.
Budapesth	6	3	"
Antwerp	4	10	"
Liverpool	4	10	"
New York	5	0	"
Chicago	4	8	"
Barcelona (Spain)	6	9½	"
Madrid "	6	11	"

It is stated that during the course of the Spanish-American war there was a very general tendency on the part of prices of commodities to rise, in sympathy with the depreciation of currency and consequent high rates of foreign exchange. Exchange, however, is now approximately normal, but prices show no tendency to fall, and particularly the prices of wheat and bread. I may state that a very similar phenomenon has arisen in Greece: general prices were at one time very high as a result of high rates of foreign exchange. In 1910, however, Greek money was actually at a premium in Greece, and yet there were no signs of a fall in prices. In both countries the mercantile community are accused of maintaining this reign of high prices for their own selfish ends. It is difficult, however, for an outsider to judge fairly of the position.

In 1909 Spain imported about £695,930 worth of wheat, and in 1908 about £777,520 worth; whilst of maize £1,025,260 worth was imported in 1909, and £1,519,260 worth in 1908.

I have already stated that the bulk of the maize appears to be drawn from the Argentine Republic; the imported wheat, on the other hand, comes almost entirely from Russian ports. In view of the high ruling rates in Spain, it may be asked whether Australian exporters might not find it to their advantage to look occasionally to Spanish ports as a suitable outlet for some of our surplus corn.

GENERAL IMPRESSIONS OF SPAIN.

Our short three weeks' visit to Spain came to an end on November 2nd, when from Barcelona we set out for Marseilles. The hasty impressions formed in the course of a flying visit do not perhaps go much beneath the surface of things, they have, nevertheless, a peculiar value of their own, in that they leave on the mind a panoramic record which closer and longer associations are too apt to efface. For the attentive observer a brief visit places everything in perspective, and thus he is perhaps better able to judge of the relative proportions and relationships of things, since as yet the woods are not hidden to him by the multitude of trees. Beyond these admissions, therefore, I

offer no apologies for a few closing reflections on a country that I had often heard of, often read about, and always wished to see.

I quitted Spain with the settled conviction that it is a country that has received but scant justice at the hands of modern writers, or more correctly, perhaps, that my personal conceptions of the country had been hopelessly at fault. The picture of a helpless retrograde Spain, sunken in sloth and ignorance, the mere shadow of her former greatness, has not infrequently been drawn, and subconsciously, perhaps, for me this picture had represented reality. Indeed, it is no easy task for the Anglo-Saxon mind to visualise some other kind of Spain; both history and tradition alike would appear to forbid it. And yet quite other was the Spain that I saw in perspective during those brief three weeks: a virile country, of those to whom future ages promise much, and yet no more than the true reflex of its variegated past. A country, too, of untold natural resources and hidden wealth, the surface of which has been no more than skimmed. In these pages I have already adverted to some of the agricultural resources of the country. In this direction it may be said, with unusual relevancy, that Spain is essentially a land of "corn, wine, and oil"; a land of broad rivers and almost unlimited irrigation supplies; a land of citrus trees and fruit trees of all kinds; of the chestnut and the cork oak; of rich lowland pastures and mountain summer feeding grounds. Indeed, there are few forms of agricultural activity possible under either temperate or subtropical zones that we do not find practised in some corner or other of this favored land.

On the other hand the mineral resources of Spain are also very considerable, and probably very scantily developed as yet. Iron, lead, copper, silver, pyrites, quicksilver, and salt are all important articles of export, representing in the aggregate from 10 to 12 million sterling annually.

Factories and manufactures appear to have become firmly seated in many centres; and although, according to the traditional standpoint, the balance of trade, as between imports and exports, is generally against Spain, the bulk of interchange involved is there to afford ample proof of great developmental activities. It is thus that in 1909 the total exports were valued at £34,299,185 and the total imports at £35,223,000.

That, in the way of development, much yet remains to be done in Spain cannot very well be denied; but so it must ever be with all countries that have any prospects ahead of them. Nor do I believe that long occupation of the soil by the same race, accompanied by inadequately exploited natural resources, is necessarily clear evidence of national retrogression, or even of stagnation. I take it that wherever a people has succeeded in maintaining its independence for centuries, its present can be read fairly only in the light of its past. It seems to me that we have here a nation that in the past has felt no special stimulus towards the development of its own natural resources. Circumstances and the national character made of it in past ages the con-

queror of weaker nationalities ; and, as usually happens in such cases, Spain left to others the uncongenial task of delving for her special requirements. And if we scan this past with impartial eyes we shall not be able to withhold admiration for the Spaniard and his acts. Scarce recovered from the thralldom of the Moors, we find purely fortuitous circumstances flooding sober, hard-working Spain with the easily won gold and silver of the newly discovered Americas. Now, wealth, however required, usually begets power, and great accordingly became the power of the Spaniard ; but wealth acquired with unexpected ease from outside sources must have the effect of checking the development of the home natural resources, the exploitation of which will always involve less congenial forms of toil. In the end this dependence on others for the ordinary requirements of life may undermine the national character, and then disaster is close at hand. The easily acquired wealth of the New World had the effect of checking the home development of Spain ; but the stern national character appears to have been proof against its more insidious inroads. The Spaniard has often been accused of ruthless intolerance in the days of his power ; but intolerance, however much we may deprecate it, was never yet the offspring of a weakly character. And it is this strength of character which made the Spaniard intolerant when power was his, which also saved him from effete degeneration in the days when wealth was to be had for the asking.

Spain's immense colonial empire is now a thing of the past, and once again the Spanish people are thrown back upon the unappreciated resources of their native soil, and already on all sides there are not wanting signs of national awakening. The general incongruities of the day, indeed, are good evidence of this ; electric tramways and electric lights in the most squalid of villages and hamlets might otherwise seem altogether out of place. The people of the Peninsula are probably the most heterogeneous in Europe, and long political union does not appear to have brought about anything like social amalgamation, as has been the case in other parts of the world. And as each race has its special temperament so this association of races, which we call Spanish people, will find ample scope for the exercise of individual energies in a land that nature has so well endowed. Under the ægis of wise statesmanship the future lies with the Spanish yeoman ; in the North of Africa, in Algeria and Tunisia, whither lack of home employment has often driven him, there exists no sturdier workman or better artisan. He is in a position to seize upon the opportunities that are now arising, and therewith will build up a new Spain.

POULTRY NOTES.

BY D. F. LAURIE, POULTRY EXPERT.

MONTHLY OPERATIONS.

A Poultry Association.—This is a convenient time of the year to consider this question. There is room for a good association which, at its inception, need not be hampered with endless regulations, committees, and pocket-depleting subscription fees. There are plenty—too many in fact—of shows at which country and other breeders can exhibit their stock. Poultry clubs, though deserving and excellent, serve the exhibitor only. They show signs of vitality but once a year. The following scheme should commend itself to breeders.

1. In every convenient centre a local body should be formed. Let some of the energetic residents ascertain the names and addresses of each person, the breeds and number of poultry owned by them, and forward to me, with the names of two or three who could act as representatives in case special or concerted action were required.

2. Those desiring to exhibit poultry at shows convenient could arrange with other branches for combined displays.

3. I am prepared to open a register of all the groups or country committees, with a record of the breeds they stock. This register would be of great value in putting breeders, buyer, and seller in touch with one another. I have frequent inquiries for stock.

4. City and suburban breeders could register names, addresses, and particulars.

5. The *Journal of Agriculture* would be the general means of communication, and expressions of opinions upon various subjects could be published. Periodical meetings of country centres could be arranged, at which lectures could be given and contributions read.

District conferences, such as North, South, South-Eastern, Peninsula, &c., could be arranged, with perhaps an annual congress of some duration in Adelaide.

6. *Expenses.*—Local committees could arrange to defray the small matter of postage and hire of rooms when required. The annual subscription to the *Journal of Agriculture* is only 1s. posted. Members would receive reports and bulletins issued by me post free.

7. So that all matters pertaining to the industry might receive attention, country poultry clubs as a body—irrespective of the action of individual members—might register and send delegates to conferences, &c.

Let the movement make a good beginning, and additions to the objective will follow in due course.

HATCHING SEASON.

Lose no time in incubating eggs—hen, duck, turkey, &c. Many breeders already have fine flocks of chickens and ducklings. From many accounts to hand, the hatching has so far been satisfactory. Concentrate all your energies during August and September, as later hatched chickens are not so valuable. In the late districts operations will be generally a month behind the northern and early portions.

THE CHICKENS.

Keep them warm and well fed, but not over fed. Never neglect them, and do not coddle them. If chickens run on boarded floors they soon die off—it has been tried over and over again. If you must use a boarded floor, cover it with three inches of dry earth and sand. Feed on a variety of cracked grains, the principal of which should be sound wheat, shelled or hulled oats, skinless barley, field peas, maize—all these should be cracked in small pieces. Give plenty of cut green food—barley grass, barley, lettuce, and tender cabbage and kail leaves. Keep a supply of coarse sand, fine grit, and also some charcoal grit. See that they are never without fresh, clean water.

DUCKLINGS

May be fed upon wheatmeal and bran (or pollard and bran) two parts, cut green food one part, mixed with milk or soup; mix to a crumbly mass. Provide clean water in water troughs so constructed that they can diply get their heads in—the water should be six inches deep, so that they can dip their heads in, and clean off any adhering pollard. Ducklings consume quantities of sand and grit, and will eat any amount of cut green food. Animal food seems an absolute necessity if good growth and quick maturity are to be attained. Let them have clean drinking water at hand day and night. House warmly and use plenty of clean, dry, soft straw or grass bedding.

GUARD AGAINST LOSSES.

Vermin.—House your chickens and ducklings where cats, dogs, foxes, crows, magpies, and other predatory animals cannot reach them. If raised by hens, &c., examine both mother and young to see that they are free of body vermin; to exterminate, apply insect powder.

Disease Germs.—Thousands of chickens die yearly because of lack of proper precautions. Scraping and sweeping will not remove micro-organisms which cause disease. At frequent intervals scrub the brooders with hot water and soap; when dry, apply a solution of formalin, carbolic acid, or any good germicide—apply inside and out. Keep the soil in yards sweet and fork

over occasionally. If any losses occur which indicate disease, the soil in the yards should be treated with one of the foregoing germicides. For young stock finely-chopped garlic is valuable; the juice has strong germicidal properties.

Lack of Ventilation.—Many brooders are death-traps through lack of ventilation. Do not expose the little birds to draughts and rough winds, but keep them on the ground and give as much air as possible.

Overcrowding is the cause of much loss annually. Remember it pays better to breed a small quantity of good chickens or ducklings than to hatch out thousands and lose 90 per cent. from various causes.

Exercise.—Keep the chickens busily scratching; it keeps them warm, and promotes active digestion. Ducklings do not require exercise. Keep them warm, clean, and growing. Those for market should be disposed of as soon as fit. Those intended for breeding stock should, when full grown, have a pond to swim in, as by swimming the duck obtains exercise.

GREEN FOOD.

Do not forget to make ample provision for the summer. Spare yards can be planted with Kentucky Blue Grass (*Poa pratensis*), which is nutritious and much liked by the birds, and also grows well. Silver beet, kails, rape, lettuce, and endives should be planted in rich soil. Get ground ready for lucerne, maize, and sunflower later on. Tagosaste (*Cytisus proliferus*) may be planted for hedges and breakwinds.

SUN SHELTERS.

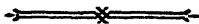
It is not too soon to think of this matter, which should not be delayed until the hot days arrive. Permanent shelters—portable, if desired—are best made of galvanized iron upon a hardwood frame. They will be cool if coated with a thick whitewash compound such as is obtainable in the markets.

GLUT EGG SEASON.

Clean, sound, fresh eggs may be sent to the Government Produce Depot, Light Square, and will be sold at best ruling prices. Large eggs generally sell for a penny a dozen more. Proper egg cases, to contain twenty-five dozens, can be supplied at cost, from 2s. 6d. for good second hand. These save freight, time, and breakages, and can be returned and used for a long time.

Correspondence.—Since the publication of the monthly operations (previously issued as a circular) in the *Journal of Agriculture*, a large body of poultry-breeders have become subscribers. To these I offer a cordial invitation to write briefly upon any matter of interest. Questions, replies, and extracts published will interest many others, and the work and value of the

Journal can be extended. Of course, where necessary, prompt answers will be sent by post, and questions, &c., marked "Journal" will appear in the correspondence section. To begin with, I shall welcome expressions of opinion *re* Egg Export, and also *re* Poultry Association.



OVERSEA EGG SHIPMENTS.

By D. F. LAURIE, POULTRY EXPERT.

At this season of the year those interested in egg production generally expect an announcement as to the season's proposals. There is no doubt that the necessity for shipments is great, because England is our natural outlet for the surplus of the glut season. Notwithstanding the opposition on the part of interested persons which the movement has encountered, I am more firmly convinced that an overseas outlet is of vital importance and absolutely essential to the well-being of the poultry industry.

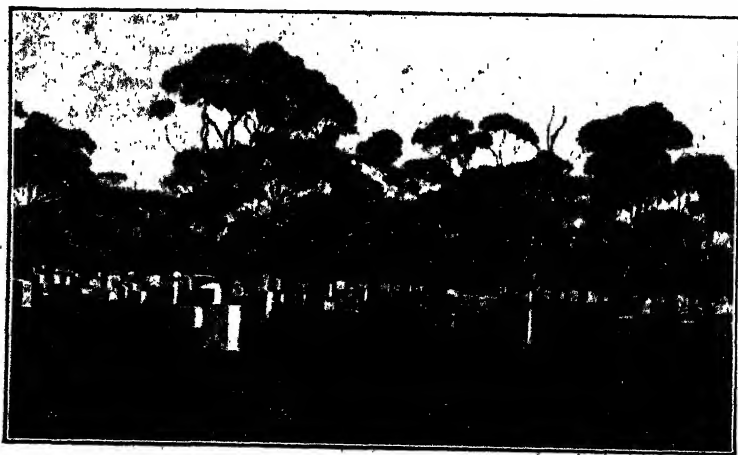
The effect on the local market of the Government movement has been most marked. In 1906, the year of the first shipment, those who rule the egg market took no active steps—just possibly they were not prepared. In 1907, however, the market reached an average figure during the glut season which was quite unheard of before. The successful results of these shipments looked so much like business that our opponents took such measures that the 1908 spring markets saw still higher prices. In the interests of the producers, I carefully collected all available statistics, and by comparing these and inter-State market reports with local market reports I proved the latter to be but the old bogey. Judged by the laws of supply and demand, there was no warrant for the prices paid.

For years the egg-producers have been complaining about the miserably low prices offered during spring on the Adelaide markets. In the early years of my appointment as lecturer, dating from 1895, I gathered together a small band of breeders who saw that the time for overseas shipment was not far off. In 1906 the Government lent a sympathetic ear and agreed to stand behind the shipments. With the exception of the breeders alluded to the bulk were indifferent; some were misled by the "hawk" cry of private

enterprise, &c.; others, equally blind but more acute, thought that by holding aloof they would gain at the expense of their fellows who assisted.

The egg-shipment scheme is one which must perforce depend upon co-operation and State aid. For many reasons the scheme could not be carried out by private enterprise. It does not matter to private enterprise whether eggs sell at 6d. or 9d. a dozen minimum price in Adelaide, but to the producer the question is serious.

To sell our eggs in England it is imperative that they should be quite fresh. The English purchaser and consumer demand the best; they will not buy stale eggs. At no time have the merchants in this State endeavored to put a stop to the traffic in eggs which are quite unfit in any form for human consumption. Until a course of vigorous and, if necessary, drastic action puts an end to this traffic our poultry industry will be hampered. Some few shops of late have made special efforts to supply their customers with genuine fresh eggs, but the bulk of the trade eggs are far from satisfactory. About three years ago the Sydney health authorities threatened drastic action in regard to South Australian eggs, and yet we are told that the trade needs no supervision. In the summer months, if one buys a dozen eggs at each of 20 stores, in 90 per cent. of the cases he will find a big proportion of stale eggs and many quite decayed. Unfortunately, the average person regards such eggs from a humorous standpoint—unless upon the platform. Vigorous action would, in time, reach to the culpable farmer as well as the trader. Our industry would be far better without these eggs and those who deal in them. Our producers who desire a prosperous industry should demand the prompt elimination of these objectionable features.



Apiary of Mr. R. McDonald, Eyre's Peninsula.

PARASITES OF SHEEP.

By T. H. WILLIAMS, Acting Chief Inspector of Stock.

Has it ever occurred to owners or managers of sheep that there is a heavy annual loss through their neglect to dip their animals and destroy the parasites on them?

There are probably quite 1,000,000 sheep infested with lice in the State to-day, and it is a low estimate to say that, by biting, scratching, and rubbing, each animal loses 2lbs. of wool yearly. At the low estimate of 6d. per pound, this represents £50,000. The unthrifty and stunted condition of the animals and the deteriorated state of their wool—worth only about 3d. per pound—means another annual loss of anything from £100,000 to £120,000. The annual loss to owners as the result of allowing sheep to remain tick-infested probably represents quite another £100,000.

These are large accounts to lay at the door of negligent management, when for an outlay of about 2d. per head sheep can be dipped in the best poisonous powder dips on the market, and the destructive parasites destroyed. Unfortunately, there are many who market their lousy sheep immediately off shears, undipped. Dealers or farmers get them, and they are spread all over the State. The buyers probably know nothing about lice, and cannot understand why the sheep do not thrive. A neighbour is consulted, and he with the owner between them conclude the sheep have some mysterious disease.

It is the duty of everyone interested in the care and management of sheep to frequently examine them, and see that they are free of parasites. The dipping regulations require that notice must be sent to the inspector of stock for the district if sheep are found dirty. The owner must not depasture or travel infected sheep on public lands or roads, or expose them in public sale yards. Heavy penalties are provided.

There is another point which must be impressed upon those who dip their sheep, and that is no carbolic or non-poisonous dips will render the sheep immune to the attack of parasites, while the best poisonous powder dips will protect them for months. When lice are present on sheep at shearing they must be dipped in poisonous powder dips off the shears, and again at the end of two months, as it always requires two dippings to free animals of lice.

The Stock Department can only recognise as properly dipped, sheep which have been through a bath composed of a poisonous dipping powder, in which they must be immersed for one minute.

Unless sheepowners in infected districts clean their sheep it will be necessary in the near future to ask for regulations giving power to keep sheep from being marketed till they have been inspected and declared free of parasites by an inspector of sheep. Sheep from infected districts have, unfortunately, spread lice to many thousands of our Northern flocks, where merinos have become infected, and some recently inspected had lost nearly half their wool.

It would probably be a good idea for owners of sheep in infected areas to form vigilance committees, and satisfy themselves that all sheep are dipped every season in approved dipping powder, and keep the inspectors of sheep posted up as to the state of things. Through determined and concerted action the sheep of the States were freed of scab years ago, and there is no reason why they should not be cleansed of lice and ticks, which are probably nearly as destructive from an economic point, but are far more easily destroyed. All the sheep inspectors have been requested to firmly enforce the dipping regulations.

The lice which infect sheep are very minute—less than one-sixteenth of an inch long, and difficult to see. They are pink in color when gorged with blood, and lie close to the skin of the sheep. When a few are seen on opening the wool, it is generally sufficient evidence of the presence of thousands on the animal examined. A low-power lens will aid in the search for them. They multiply rapidly, the eggs being deposited at the roots of the wool, where they are hidden by particles of yolk, &c. The embryo, being surrounded by a protecting greasy substance, is not touched by the dip; hence the urgent need for a second dipping to destroy the young lice.



FARMING IN SOUTH AUSTRALIA.

AS SEEN BY NEW SOUTH WELSHMEN.

Some of the delegates from New South Wales, who attended the Dry Farming Conference in Adelaide during March of this year, have been giving their impressions of South Australian farming in the *Agricultural Gazette of New South Wales* for July. These papers should make very pleasant reading for our agriculturists, the criticisms are so few and the commendation is so freely given.

We quote the following extracts, beginning with the notes and impressions of Mr. H. C. L. Anderson:—

A visit to some of the principal wheat-growing districts of South Australia will at once convince the visitor of the great prosperity that is now blessing the primary producers, and incidentally, of course, the whole of that State. 'One hears stories in Adelaide about farmers going to market, to church, and to agricultural shows in motor cars, two sometimes belonging to one family, and 20 being seen at one festival. Without being able to certify that this is generally true, one can say that many farmers are retiring from active work at middle age, and are building for themselves very comfortable houses nestling amid verdant orchards and pretty gardens in the nearest townships, and the number of retired farmers, men in the full prime of their lives, enjoying their well-earned leisure, is quite a feature in South Australia.

And whence come these charming flowers, these luscious fruit and grapes, not always to be seen round farmers' houses in our own dry districts? From the great reservoirs of Beetaloo and Buhdaler up in the hills, which supply water in pipes to every farm along 70 miles of road. The Mother State has yet something to learn about water conservation, and incidentally about improving the conditions of living in dry districts.

The principal causes of this prosperity are:—

- (1) The greater rainfall of the past five or six years, more especially during the last three.
- (2) The increased use of superphosphate, of which 76,500 tons were used last year on 2,100,000 acres, as against 12,500 tons on 250,000 acres in 1898.
- (3) The increase in the practice of fallowing, which has risen in the Central district from 23.5 per cent. of the total area under crop in 1896 to 53.3 per cent. last year; in the Lower North there has been an increase from 29.2 per cent. to 68.7 per cent.; and in the Upper North, where wheat farming is conducted under special climatic difficulties, the increase has been from 26.7 per cent. to 63.4 per cent. In other words, this means that during last season, whilst 1,830,868 acres were under crop no less than 1,118,492 acres were being fallowed, and the fallows were worked during the summer.

The success due to this combination of causes has been phenomenal, the average yield having risen from 4.64 bush. in 1899 to 13.26 bush. 10 years afterwards. A visit to some districts which have very low rainfall gives one cause to think seriously of the climatic conditions of large areas of New South Wales, which are apparently as favorable as those of the whole of the Upper North of South Australia, where half a million acres are now ploughed for wheat, and also as those of a large part of the Lower North, where 1,200,000 acres are annually cultivated for that crop. It is true that we are not yet growing wheat in our similar areas of low rainfall, but that is due more to the lack of cheap transportation than to want of enterprise in our pioneers or to ignorance of our great potentialities.

But Victoria and South Australia have pushed railways into dry districts in confident advance of settlement, and the results have justified the bold statesmanship of such a policy. Truly South Australia had some big men when her schemes of water conservation and of railway branch lines were adopted.

Twenty years ago we were importing wheat from South Australia; this year we are exporting 13,000,000 bush. And yet we are cultivating only 2,000,000 acres, though we have fully proved our wheat belt to cover 10 times that area.

If we can demonstrate a system of three years' rotation—fallow, fodder crops, and wheat—suitable for our districts enjoying a total rainfall as good as and generally better than that of the six prosperous districts described (Roseworthy, Gladstone, Quorn, Port Pirie, Orreroo, Petersburg), such a rotation and system as we are now trying at Nyngan and Coonamble, which are both outside the safe wheat belt as at present defined, we shall have extended that belt 50 miles west, and shall have increased the wheat-producing area by 50,000,000 acres.

Mr. Geo. L. Sutton, late Wheat Experimentalist, writes :—

The South Australian works hard. From ploughing time in June until sowing time in April he puts in an amount of constant work that would appal the majority of farmers in any of our wheat districts. Living in a country where farming has been followed for a long period, he is probably more conservative, and would now be just as surprised if asked to do less work as the farmer of New South Wales is when asked to do more in order to prepare his land properly.

The South Australian seems keenly alert to devise implements that will suit his peculiar conditions. A noticeable feature in this respect is the advent of a seed and manure box attached to the implements for working the fallow land. Such a machine enables the seed and the manure to be sown at the last working of the fallow, and dispenses with the operation of drilling. There seems no reason why such a practice should lessen the yield. It will unquestionably lessen the cost of production, and seems admirably suited for Australian conditions.

Our present wheat districts seem to possess more natural advantages than those of South Australia. On the whole the soil seems rather richer; nor are weeds so plentiful. But in South Australia the soils are generally lighter, and in this respect are probably better adapted to make the most of a scanty rainfall.

In South Australia the number and growth of weeds is phenomenal. In New South Wales the growth is not nearly as great, and is viewed in many places with complacency, because most of the weeds are good stock feed. In South Australia many of the weeds are valueless in this respect.

The farmer in New South Wales has hardly realised how serious takeall is. It is well that he should do so, in order that he may be on the alert to control it. As an illustration of its destructive character, a farmer at Crystal Brook instanced a case in which 225 acres out of 250 acres were ruined by this dreaded pest.

It is evident that, owing to their proximity to the ocean, some of the South Australian districts do not experience the hot dry winds which at harvest time are felt in some of our dry areas, especially in the west. This is in contrast to the conditions obtaining during the harvest of our dry areas, and especially the western ones, when, if a breeze springs up, it is generally of such a character that stripping is facilitated.

Mr. R. W. Peacock (Manager of the Bathurst Experiment Farm) and Messrs. E. Crouch and Geo. Lindon, of Wagga, also contribute interesting observations on our climate and methods of farming.

AGRICULTURAL STATISTICS.

FOR THE YEAR 1910-11.

Last month we gave a general summary of the cereal harvest for 1910-11, taken from the annual statistics, compiled by Mr. W. L. Johnston, and issued by the Government Statist (Mr. L. H. Sholl). From the same report we now publish some further details:—

WEATHER CONDITIONS.

Though the whole State was visited by an exceptionally heavy monsoonal rain in the month of March, the season proved to be a late one owing to a prolonged dry spell during April and the early part of May. From the following table, showing the average monthly rainfall over the agricultural areas, it will be observed that the year was a very wet one:—

AVERAGE MONTHLY RAINFALL OVER AGRICULTURAL AREAS.

Period.	April.	May.	June.	July.	Aug.	Sept.	Total Six Months.	Oct.	Nov.
	In.	In.	In.	In.	In.	In.	In.	In.	In.
1910.....	36	4.06	3.19	4.56	2.18	3.39	17.74	2.30	1.73
1909.....	2.68	3.59	3.25	3.61	4.79	1.74	19.66	1.92	1.60
Mean for 50 years..	1.77	2.63	3.05	2.86	2.60	2.11	15.02	1.83	1.08

The total rainfall for the six months, April to September, being 17.74in., or 2.72 above the mean of the last 50 years, the crops in many of the counties in the Central Division suffered considerably from too much rain, while those in the Upper Northern Division were greatly benefited, averaging 11.87bush. per acre, the highest on record.

ACREAGE UNDER CEREALS.

(Figures in brackets are those of the previous season.)

The total area under cultivation with cereals for grain, hay, and fodder was 2,689,607 (2,474,501) acres, an increase of 215,106 acres.

The following table shows at a glance the distribution of the area in comparison with the previous season:—

Division of State.	Wheat.	Barley.	Oats.	All Other Cereals.
	Acres.	Acres.	Acres.	Acres.
I. Central	786,134 (736,291)	21,438 (27,672)	76,385 (85,276)	16,027 (14,406)
II. Lower North	656,494 (641,491)	2,230 (2,766)	29,954 (34,299)	7,398 (6,174)
III. Upper North	314,085 (298,896)	196 (170)	3,450 (1,922)	1,966 (1,542)
IV. South-Eastern	285,468 (198,597)	11,361 (11,141)	43,101 (49,973)	5,810 (5,401)
V. Western.....	402,000 (341,122)	2,859 (4,372)	22,825 (12,785)	426 (205)
Total 1910-11	2,444,181	38,084	175,715	31,627
Total 1909-10	2,216,397	46,121	184,255	27,728
Increase or Decrease	227,784	— 8,037	— 8,540	3,899

It will be observed that area under wheaten grain shows an increase of 227,784, while there are decreases in the acreage under barley and oats of 8,037 and 8,540 acres respectively.

PRODUCTION.

The following is a summary of the total yields and averages of the chief cereal and hay crops in comparison with the crops of the previous season:—

Kind of Crop.	Seasons.				Increase or	
	1909-10.		1910-11		Decrease.	
	Bush.	Avg.	Bush.	Avg.	Bush.	Avg.
Wheat	25,133,851	13-26	24,344,740	11-57	— 789,111	— 1-69
Barley (total all kinds)	691,424	16-50	544,471	15-79	— 146,953	— 0-71
“ Malting	446,825	16-03	344,665	14-83	— 102,160	— 1-20
“ Cape	218,771	17-73	186,912	18-59	— 31,859	+ 0-86
“ Other	25,828	15-36	12,894	11-01	— 12,934	— 4-35
Oats	1,209,131	14-17	1,136,618	14-63	— 72,513	+ 0-46
Rye	15,021	9-81	7,851	7-53	— 7,170	— 2-28
Peas	129,292	16-24	188,786	19-61	+ 59,494	+ 3-37
	Tons.		Tons.			
Hay (all kinds)	574,475	1-35	595,064	1-35	+ 20,589	—
“ Wheaten	439,469	1-38	464,048	1-38	+ 24,579	—
“ Oaten	121,995	1-26	121,017	1-26	— 978	—
Straw	16,234	—	12,202	—	— 4,032	—

VALUE OF WHEAT CULTIVATION.

To show the importance of the wheat harvest to the State it is only necessary to mention that the production of grain for each of the last five years has averaged 21,095,664 bush., and, inclusive of the wheaten hay crop, the mean annual value for five seasons was £5,142,261, the value of the 1910-11 wheaten grain and hay crop on the average prices to date being £5,392,933.

As intimately associated with wheat culture the fact should be remembered that the capital invested in machinery and implements owned by the farmers was in 1910 assessed at £2,053,414, and further that the prosperous condition of the farming industry is directly reflected in the flourishing condition of many of the secondary industries of the State, notably the agricultural implement and machine works, which for 1910 numbered 60, all employing four or more hands, the total hands being 1,536, who received in wages £142,563, and turned out work to the value of £367,998.

The following tables show particulars of wheat culture in each division of the State for the season 1910-11, contrasted with the mean of the last five seasons.

ACREAGE UNDER WHEAT FOR GRAIN ONLY.

Season.	Total for State.	Divisions of State.				
		I. Central.	II. Lower North.	III. Upper North.	IV. South-Eastern.	V. Western.
1910-11	Acres. 2,104,717	Acres. 634,242	Acres. 571,641	Acres. 268,020	Acres. 263,319	Acres. 367,845
Mean last five seasons ...	1,826,817	570,644	535,129	296,460	141,873	282,710
TOTAL WHEAT PRODUCTION.						
1910-11	Bush. 24,344,740	Bush. 7,462,036	Bush. 7,801,368	Bush. 3,180,885	Bush. 2,669,857	Bush. 3,229,604
Mean last five seasons ...	21,095,664	6,868,324	7,489,987	2,997,140	1,453,892	2,286,312
AVERAGE YIELD PER ACRE.						
1910-11	Bush. 11-57	Bush. 11-77	Bush. 13-65	Bush. 11-87	Bush. 10-14	Bush. 8-79
Mean last five seasons ...	11-54	12-03	13-99	10-11	10-24	8-08

We have reason to be gratified with the record for the whole State—For 1910-11 season—Wheat for grain, 2,104,717 acres, 24,344,740 bush., 11-57 bush. average per acre. Mean for last five seasons—Wheat for grain, 1,826,817 acres, 21,095,664 bush., average 11-54 bush. per acre.

The Lower North Division has averaged for the last five seasons 7,489,987 bush. of wheat, or 14 bush. per acre.

Division and County.	Wheat for Grain.				Rainfall (Approximate Mean).	
	Area Sown.		Average Yield per Acre.		1909.	1910.
	1909-10.	1910-11.	1909-10.	1910-11.		
I. CENTRAL—	Acres.	Acres.	Bush.	Bush.	Inches.	Inches.
Adelaide	14,306	15,204	14-39	10-51	37-53	33-21
Albert	47,449	58,171	10-59	8-77	12-06	15-92
Alfred	29,252	40,094	11-95	13-27	10-46	15-90
Carnarvon	2,066	3,443	5-90	3-40	25-80	35-36
Eyre	56,361	63,591	10-16	11-53	14-12	18-84
Fergusson	137,478	142,644	15-02	13-35	20-59	21-80
Gawler	117,202	123,863	16-87	12-59	21-18	21-66
Hindmarsh	22,330	24,104	13-41	7-82	29-93	31-56
Light	93,173	96,470	17-41	13-27	24-74	25-80
Sturt	66,617	66,658	10-89	8-73	21-26	22-01
Total	586,234	634,242	14-21	11-77	21-75	24-21
Increase ..	—	48,008	—	—	—	2-46
Decrease ..	—	—	—	2-44	—	—
II. LOWER NORTH—						
Burra	21,262	23,541	14-66	16-59	12-20	17-99
Daly	227,457	224,596	15-48	12-43	18-90	20-66
Hamley	40	170	5-00	8-82	10-46	16-08
Kimberley	12,371	14,017	9-26	11-92	12-39	17-83
Stanley	153,114	169,485	18-89	14-89	22-02	25-19
Victoria	137,176	134,553	16-49	14-04	18-46	24-30
Young	3,555	5,279	7-06	7-18	9-55	16-18
Total	554,975	571,641	16-45	13-65	14-85	19-74
Increase ..	—	16,666	—	—	—	4-89
Decrease ..	—	—	—	2-80	—	—
III. UPPER NORTH—						
Blachford	9,205	7,799	7-17	8-23	12-85	15-04
Dalhousie	87,891	81,642	10-05	12-31	14-30	19-13
Derby	—	—	—	—	6-12	9-68
Frome	100,202	106,975	13-18	13-12	17-01	22-81
Granville	15,955	13,976	7-46	9-05	12-42	15-48
Hanson	21,098	21,699	8-91	7-61	11-30	14-13
Herbert	6,612	7,707	6-85	13-03	8-64	14-04
Lytton	—	—	—	—	7-53	10-44
Newcastle	19,104	28,222	10-36	11-06	13-18	16-03
Taunton	23	—	8-70	—	10-92	13-78
Total	260,090	268,020	11-05	11-87	11-43	15-12
Increase ..	—	7,930	—	-82	—	-3-69
Decrease ..	—	—	—	—	—	—

Division and County.	Wheat for Grain.				Rainfall (Approximate Mean).	
	Area Sown.		Average Yield per Acre.		1909.	1910.
	1909-10.	1910-11.	1909-10.	1910-11.		
IV. SOUTH-EASTERN—	Acres.	Acres.	Bush.	Bush.	Inches.	Inches.
Buccleuch	28,119	46,082	8-14	8-15	23-28	19-10
Buckingham	24,584	27,502	9-07	10-64	23-23	21-54
Cardwell	1,966	2,908	6-39	6-03	24-95	20-91
Chandos	87,641	133,220	13-02	11-87	18-30	19-27
Grey	7,518	11,924	15-47	9-40	38-12	39-15
MacDonnell	5,875	8,464	9-39	6-42	27-40	28-43
Robe	4,318	8,468	10-68	7-34	30-06	31-76
Russell	21,341	24,751	9-58	7-06	20-79	20-47
Total	181,362	263,319	11-18	10-14	25-77	25-08
Increase ..	—	81,957	—	—	—	—
Decrease ..	—	—	—	1-04	—	-69
V. WESTERN—						
Buxton	2	60	34-00	16-47	—	—
Dufferin	5,269	7,458	8-81	7-73	11-90	13-80
Flinders	64,835	72,331	8-03	8-20	21-64	27-79
Hopetoun	7,389	8,964	9-15	8-37	11-87	10-99
Jervois	73,221	98,063	10-90	9-24	13-96	15-70
Kintore	21,786	22,763	6-25	5-14	12-52	10-56
Le Hunte	290	355	9-31	10-42	15-30	15-34
Manchester	90	135	8-33	8-44	9-88	15-30
Musgrave	15,285	21,105	8-90	9-58	19-60	20-19
Robinson	59,099	61,819	8-85	9-69	17-69	18-10
Way	65,811	74,397	8-25	9-05	14-29	12-72
York	—	45	—	13-33	10-46	17-34
Total	313,077	367,495	8-86	8-79	14-46	16-17
Increase ..	—	54,418	—	—	—	1-71
Decrease ..	—	—	—	-07	—	—
SUMMARY.						
I. CENTRAL	586,234	634,242	14-21	11-77	21-75	24-21
II. LOWER NORTH	554,975	571,641	16-45	13-65	14-85	19-74
III. UPPER NORTH	260,090	268,020	11-05	11-87	11-43	15-12
IV. SOUTH-EASTERN	181,362	263,319	11-18	10-14	25-77	25-08
V. WESTERN	313,077	367,495	8-86	8-79	14-46	16-17
GRAND TOTAL	1,895,738	2,104,717	13-26	11-57	17-65	20-06
Increase ..	—	208,979	—	—	—	2-41
Decrease ..	—	—	—	1-69	—	—

RAPE AND BARLEY IN DRY AREAS.

PAPER READ BY MR. C. E. BIRKS, WANDEARAH, AT THE DRY FARMING CONFERENCE, MARCH, 1911.

Wheat-growing during the last few years has been a profitable undertaking on account of the heavy yields and good prices, but it is more than likely that in the near future, what with the enormous area being opened up and to be opened up in many parts of the world, the price of wheat will suffer a considerable decline, and the yields may not always be as heavy as of late years—not only on account of drier seasons; even in wet years the returns are lessened by the excessive rainfall.

Rape and barley can be grown with a low rainfall, and as fodder crops are profitable and work in well in a rotation and help the wheat crop, which in farming areas of the North must always occupy first place. As there is no other grain crop that we can grow for which we can get a ready sale at payable prices, we must depend on fodder crops to help swell the returns of the farm.

Over a very large area in the north of this State, with a system of thorough cultivation, or, better still, under dry farming, and where wheat can be grown profitably, rape and barley can also be made to pay well as long as lambs can be got rid of in unlimited numbers at 7s. 6d. or over and butter at 9d. per pound and over on the farm. The returns will compare very favorably with wheat, and in some years return more, besides having decided advantages, which I propose to touch on later.

It is evident that by growing three different crops instead of one the risks from loss in various ways are lessened considerably. In going in for these crops two important points must be considered. First, a suitable rotation that will get the most out of the crops, yet at the same time increase the fertility of the soil. Second, the subdivision of the farm. No regular rotation can be adopted unless the paddocks are of a somewhat uniform size, and the smaller the paddocks the better for stocking purposes.

The choice of a rotation to be adopted will be dependent on circumstances to a great extent, i.e., the use to which the fodder crops are to be put; but whatever it is, care should be taken that it is such as to permit of the land being ploughed as soon as possible after the rape crop has been fed off, so as to make the most of the manure and moisture resultant from the feeding

off of the crop. The following order of crops is a good one for a farm where fat lambs are to be raised and cows kept for milking purposes :—Fallow, rape, barley, fallow, wheat, grass, grass. Rotation and subdivision having been decided on, the farmer must make up his mind to do all the cultivation on the dry farming method to get the best results; at any rate it must be thorough and done at the right time. Rape, of all plants, must have land worked down to a fine tilth, but the soil must be consolidated to ensure a good germination and to convey the moisture that has been stored by the fallowing and continual working to the plant, and when put in under these conditions the rape plant, once it has germinated, can withstand a good spell of weather without rain; in fact, warm weather at that stage is more welcome to it than the cold.

Starting with rape on fallow and noting the order of the rotation previously mentioned it will be seen that it is not absolutely necessary that we should wait very long after the first rain to sow the rape; in fact, in some soils it can be sown before and no harm will result if it has to lie for some weeks before rain comes. The few weeds that would come away on well-worked fallow if the seed was sown immediately after the rain would not be a serious matter, for they would be fed off before going to seed, as sheep are not fond of rape straightway and eat almost anything first. Then again the barley following on the rape and being fed off gives another chance of cleaning. Then comes fallow again before wheat, thus giving us a third chance of a clean crop. For those who believe in burning stubble a second wheat crop could be taken off, but to my mind a few pounds of lucerne seed sown with the wheat on the fallow to make a bit of feed till the grass gets a start is a better plan where fertility of the farm is the main object, as it should be.

A comparison of the wheat and rape shows the latter in a very favorable light. In the first place the cultivation of the two is the same; manure, ditto; seed, $\frac{1}{2}$ bush. to 1 bush. of wheat at 3s. 6d., as against 3 lbs. to 6 lbs. at 4d. of rape. Again, the harvesting of the former as against the attention to the sheep and marketing the lambs gives the latter a very big pull on the wheat; then again the wheat has to stand through those risky months, October and November, whereas all anxiety with rape and lambs is over before then.

Eight ewes and lambs to the acre on a crop put in under the above system is by no means a high estimate, and I have done it for several years on rape, not on fallow. With lambs at 8s. and crediting the rape with part of the wool clip of ewes, which is increased by the condition the ewes are kept in, and taking into account the advantages previously mentioned, it is evident that we must obtain a 20-bush. crop at 3s. 6d. to compare with the rape. But the advantages do not end here. I have proved year after year that increased yields of wheat and hay can be obtained after rape, and the following are in my opinion some of the reasons. Rape is a deep-rooted plant, in some soils going down a foot or more, but on our Northern soils, which are not noted

for depth, the roots will go down 6in. to 8in., deeper than the wheat roots in the same soil. The crop is fed off and returned to the surface minus a small percentage retained by the sheep, and is left in a form readily available as plant food and as a moisture conserving agent, inasmuch as the organic matter tends to make the soil more of a loamy nature and again supplies warmth to the soil, thereby enabling the organisms in the soil to set free plant food that otherwise would stay in an insoluble form. It often happens that a rain in October or November, after the rape has been fed right off, will bring on another good growth; but if the rotation is to be adhered to, it is better to get the skim ploughs to work and summer fallow for the succeeding barley crop; this in turn is fed off by horses, cows, and sheep. We thereby saving the grass when in the young and tender stage, and though the return from this source cannot be so easily reckoned as the two former crops, by its enormous feeding capacity it comes pretty close up to them. It also has its beneficial effect on the wheat crop.

Fallow comes next in the rotation, and this gives the organic matter the chance of being thoroughly mixed with the soil. It becomes part and parcel of the soil and ready for assimilation by the wheat plant, and also acts, as before stated, as a moisture conserver and plant food producer.

One of the benefits of the rape on the soil has been omitted, viz., roots having penetrated the lower layer of soil in search of moisture, &c., they act to a certain extent as subsoilers which in time will enable one to plough deeper than would otherwise be the case. Until we can plough the soil deeply, dry farming cannot be carried out to its fullest extent.



ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, July 12th, there being present Messrs. J. W. Sandford, C. J. Valentine, Geo. Jeffrey, A. J. Perkins, Colonel Rowell, G. R. Laffer, A. M. Dawkins, Chas. Willcox, and the Secretary (G. G. Nicholls).

The retiring Chairman (Mr. Sandford) read an intimation from the Hon. Minister that Colonel Rowell, Messrs. Dawkins, Geo. Jeffrey, and the Chairman of the Vinegrowers' Association had been reappointed as members of the board for a further term of two years.

Messrs. Dawkins and Willcox were appointed Chairman and Vice-Chairman respectively for the ensuing year.

RAIL TICKETS TO CONGRESS.

A request from the Kingston Branch, that three second class free tickets should be issued to each Branch for delegates to Congress instead of two first class, was considered. As the matter had been fully discussed at Congress previously, and the principle of issuing first class tickets had then been affirmed, the Board decided to take no action.

CONGRESS.

A suggestion was received from one Branch that Congress should be held in the week prior to September Show week. This was considered impracticable.

Other Branches asked that more time should be devoted to addresses from the departmental officers. Matter referred to Congress for consideration.

It was decided that the sessions for Congress should be arranged for the same hours as last year, viz., September 11th, 8 p.m.; 12th, 10 a.m., 12-15 p.m., and 7-30 p.m.; 13th, 10 a.m. to 1 p.m., and at 7-30 p.m.

BERSEEM, OR EGYPTIAN CLOVER.

Professor Perkins gave an interesting account of the growth of this fodder at Roseworthy College Farm. The seed was sown on April 5th last, and cutting commenced 10 weeks later. From then till July 10th, 24 milch cows had been fed twice daily from the plot, and the yield to that date had been at the rate of 13 tons 3cwt. 34lbs. per acre. This was a greater production than the heaviest ensilage crop ever cut on the College Farm. Rape and barley put in at the same time had not made anything like the same

progress. It was decided to suggest to the Hon. Minister that a quantity of this seed be imported and distributed.

RABBIT DESTRUCTION.

The Chairman reported that acetylene gas had been used with great success instead of bisulphide of carbon for the destruction of rabbits. A tin of water was placed in the mouth of the burrow and a piece of carbide put into the water. The burrow was then sealed up to keep in the gas.

MOLINEUX MEMORIAL.

The matter of perpetuating the memory of the late Albert Molineux was considered. In view of the amount subscribed, viz., approximately £150, being insufficient to establish a scholarship at the Roseworthy Agricultural College, it was decided to appoint three trustees—viz., Messrs. A. M. Dawkins, J. W. Sandford, and the Principal of the Roseworthy Agricultural College—to invest the money and to devote the interest to the purchase of prizes to be offered at the College and known as the Albert Molineux Memorial Prize.

On the motion of Mr. Laffer it was decided to suggest to the Hon. Minister of Agriculture that one of the new hundreds being opened for settlement should be named “Hundred of Molineux.”

The Chairman welcomed Mr. G. G. Nicholls (the newly appointed Secretary to the Board) who, he said, had acted on previous occasions and was acquainted with the working of the Agricultural Bureau.

The following gentlemen were approved as members of the undermentioned Branches:—Messrs. J. W. Best, Mount Bryan East; H. F. Johnson and H. L. Hancock, Cummins; F. and B. Speckman and W. R. Neville, Wilkawatt; G. L. Tucker, Nantawarra; J. Vivian, F. A. and P. H. Wheaton, J. Prevost, S. Trewin, J. J. Hayes, E. Steele, Redhill; W. Queale, H. Mathias, Lameroo; C. H. Shilling, C. A. Nicholas, Arthurton; J. Allen, A. Phillips, J. McIvor, Coonalpyn; W. T. Hetzel, Wepowie; T. G. Fleming and A. C. Hilse, Hawker; H. E. and G. Boord, S. H. Clutterbuck, and F. Morris, Northfield; F. S. Loveridge, T. Reardon, A. Cornelius, and G. M. Wilson, Mundoora; R. Morgan, Elbow Hill; W. H. Best and J. S. McEwin, Blyth; H. Tilley, Butler; J. C. Walter, J. Allen, and W. Frisby, Waikerie; G. E. T. Pearson and G. Jones, Penong; E. Glasson, Port Germein; W. S. Noack and Morris, Freeling; F. Modra, Yorketown; H. Burnett, D. Rickaby, H. C. Parker, G. Cross, W. G. Wilson, and L. A. Parker, Sherlock.

As Mr. R. J. Needham was still laid aside by indifferent health, the Board granted him three months' leave of absence.

BEE-KEEPING NOTES.

By T. E. WHITELAW.

SCUM AND DENSITY IN HONEY.

The complete elimination of scum is very necessary when seeking to secure honey of the finest quality. A certain percentage of the honey produced in this State is deficient in this respect, and the sooner this is remedied the better it will be for the industry in general. Since the advent of a sound export trade, which is rapidly increasing, a marked improvement is noticeable in the preparation of South Australian honey. Certain honeys are more prone to produce scum than other varieties. This frothy matter is mainly composed of air bubbles and minute particles of wax and pollen, and presents an objectionable appearance to the purchaser who will often associate it with the term "bad honey." If newly extracted honey is run into large tanks, and is allowed to settle so that the scum can rise to the surface, it is readily skimmed off prior to tinning, and the honey will be free from froth:

It is surprising to see the quantity of small grains of wax and pollen that can be removed in this manner from an apparently clean honey if it is allowed to settle. Honey that is allowed to stand in a warm dry atmosphere for some days becomes ripper, and possesses an improved density. Covering the tank with a stout cheese cloth prevents the ingress of dirt, while at the same time the warm dry air is admitted, which absorbs the surplus moisture in the honey.

Some of the honey received at the Government Export Depot has to be purified before it is exported, because it has been insufficiently treated by the beekeeper. This unnecessary work should be done away with if due attention was paid to the question of ripeness and density by each individual beekeeper. Thin, unripe honey is always liable to fermentation, and the Commerce Act distinctly states that only ripened and unfermented honey from bees shall be exported, unless it be clearly branded "Below Standard." The last tins drawn from a tank are always carefully watched to see that there is no scum and that the density is right. Thin honey always rises to the top of the tank and is the last to be drawn off.

When honey is tinned off immediately after extracting, froth is certain to be present. By passing the honey, after it leaves the extractor, through a strainer composed of fine brass gauze, the largest particles of wax and pollen are removed.

CURATIVE EFFECT OF HONEY.

In France honey is used in the treatment of foot and mouth disease in cattle. The French Government publish the following instruction :—"To treat effectually this disease first remove the small skins resulting from the breaking of the blisters ; then bathe the mouth with water in which vinegar and honey have been mixed."

BEE PARASITES.

Amongst the numerous inhabitants of a bee-hive, there will at times be found insects which do not in any way belong to the apidæ family, but have a parasitic tendency to congregate with them. Many of the habits of these insects are interesting to entomologists, and one which has excited special attention is a small brownish parasite, which attaches itself to the body of the bee in the same manner as *pulex irritans* associates itself with human beings. *Bracula cæca*, as it is termed, is rarely found in great numbers on the drones or workers, but evidently prefers to confine its attentions to the queens. It is usually found fixed to the thorax, probably because the bees may have more difficulty in dislodging them from this situation, or possibly because the preponderance of hairs on that part of the body is better suited to their habits. It has been stated that they do little injury, but there can be no doubt that they are very worrying to queens, retarding their laying powers. I once possessed an excellent queen, who suddenly failed, and examination revealed the fact that she had fifteen of these lice on her thorax. These were removed by the aid of tobacco smoke, and within a few hours her former laying power commenced to return, and in two days' time she had quite recovered. These lice have quick, active movements, but are nevertheless blind. They are without wings and have three pairs of legs, which possess curious notched feet, thus enabling them to maintain a tenacious grip. They are very prevalent on Italian queens imported from Italy.



Yarley Apiary, Eyre Peninsula.

PEACH LEAF CURL FUNGUS.

TREATMENT WITH COPPER COMPOUNDS.

By GEO. QUINN, Horticultural Instructor.

It is now 20 years since the first trials with copper compounds were inaugurated by the Angaston Experiment Committee in this State. As a direct result of these early trials the use of Bordeaux mixture, made according to various formulæ, has received general acceptance at the hands of South Australian orchardists for the suppression of peach leaf curl fungus (*Exoascus deformans*, Fuekl) and several other fungus diseases affecting our orchard trees. Owing, however, to the difficulty experienced in some localities in procuring and preserving quicklime in a condition suitable for the manufacture of the compound a desire has arisen for some fungicide less troublesome in this respect, as well as less tedious to prepare.

The so-called Burgundy or copper soda mixture, has been proposed and used to a limited extent, but it has not received general approval. A few growers only have adhered to the use of a solution of copper sulphate without the addition of either lime or soda. Since the researches of Mr. Spencer U. Pickering, F.R.S., have been given to the world in the Woburn reports, considerable light has been thrown upon the composition and effects of Bordeaux mixture and other copper compounds as ordinarily prepared for fungicidal purposes. In his endeavors to bring the composition of Bordeaux mixture to an exact unvarying consistency Mr. Pickering suggested the preparation of a paste which should, whilst retaining all of the valuable fungicidal qualities of the standard Bordeaux mixture, be more readily mixed with water, pass more easily and less injuriously through the spraying apparatus, as well as set into action some of its fungicidal properties without delay. With commendable enterprise a local firm of manufacturing chemists, Messrs. Bickford and Sons, prepared and placed upon the local market several seasons ago a Bordeaux paste formulated upon the lines since indicated in the Woburn reports.

With a view to arriving at something approaching exact results a comparative test of the protective values of these various copper compounds was initiated in the Government Experiment Orchard at Blackwood last season,

the work being carried out with very great care by Mr. C. G. Savage, the orchardist in charge.

The conditions prevailing at Blackwood were favorable to most fungus diseases. The year's rainfall reached 33·24in., the winter and spring being very wet and summer proving cool and showery, whilst the clay soil, under the



FIG 1.

Two-Year-Old Elberta Peach Tree, Never Sprayed. Soil Dressed with $\frac{1}{2}$ lb. Iron Sulphate Over the Roots.

influence of frequent tillage, retained much moisture. Of the above total 22·20in. fell before this spraying began and 8·65in. were registered between the first spraying and the date of plucking the leaves. A glance at Fig. 1 clearly shows that the leaf curl fungus was prevalent in the orchard on unsprayed peach trees. The peach trees in the plot operated upon consist entirely of the variety Elberta, which in its susceptibility to the attack of the leaf curl disease is found in this State to be distinctly above the average. These trees are planted in three rows, running east and west along the hill slope, there being 26 trees in each row. The block of trees forms a portion of a permanent manure test, for which purpose the long rows are cut at right angles into divisions giving three trees in each row running north and south. In the manure test every second row is manured, the alternating rows being planted as a buffer to the searching roots of those manured. It was the trees in these buffer rows which were used in this trial, the manured peach trees being sprayed as usual with standard Bordeaux mixture. One row, however, which has had a dressing of sulphate of iron about the roots each season has not been sprayed with fungicide, and Figs. 1 and 2, previously referred to,

are typical examples thus far of the ineffective nature of this dressing as a preventive of leaf curl disease. With the exception of two rows, which are two years old, the trees are three years planted, and, as indicated by Fig. 3, are exceedingly well grown, standing quite 6 $\frac{1}{2}$ ft. high by about 7 $\frac{1}{2}$ ft. across.

Having made the above explanation it is proposed in this report to refer to those 12 rows of trees which have been incorporated in the spraying trial, with passing references only to the trees in the thirteenth row, which received the dressing of iron sulphate around their roots.

The compounds used were—

1. Bordeaux mixture.
2. Burgundy or copper soda mixture.
3. Bordeaux paste (Bickford's).
4. Copper sulphate.

1. The Bordeaux mixture was made from 1lb. copper sulphate and $\frac{1}{2}$ lb. freshly burnt quicklime in 10galls. of water, containing therefore 1 per cent. of copper sulphate.

2. The Burgundy mixture consisted of 1lb. copper sulphate, 1 $\frac{1}{2}$ lbs. carbonate of soda (normal), locally known as washing soda crystals, in each 10galls. of water. This also contained 1 per cent. of copper sulphate.

3. The Bordeaux paste was liquified in water as directed on the container, its copper sulphate equivalent, according to the manufacturer's guarantee, being above 1 per cent.

4. The pure solution of copper sulphate used contained $\frac{1}{4}$ lb. of that salt in 10galls. of water, being thus of a strength of one quarter of 1 per cent. copper sulphate.

Of the 12 rows sprayed three rows were treated with each of the above four compounds. These, however, were not taken in consecutive order, as the attached table will show, but were laid out in three recurring series. This plan was adopted to distribute as evenly as possible any effects producible by variations in the soil, or differences due to possible atmospheric influences.

Some of the rows treated with the Bordeaux mixture, copper soda, and Bordeaux paste respectively were sprayed twice; but in the case of the pure solution of copper sulphate one spraying only was applied to each row. The first sprayings to the whole of the rows were given on August 15th and 19th, all the second on September 6th, or from 18 to 22 days later. The vegetative condition of the buds on these peach trees at the period when the first dressing was applied was apparently one of complete inactivity. At the time of the second spraying the buds were rapidly expanding into blooms.

The development of the foliage was constantly kept under observation, and when the growth of the trees had reached the condition indicated by the photographs reproduced here, viz., on November 22nd two of the staff carefully examined each tree branch by branch, and every leaf upon it showing any sign of being affected by the curl fungus was plucked into buckets and carefully counted and recorded before passing on to the next tree. Several subsequent examinations were made to ensure accuracy, but no fresh recur-

rence of the disease was detected. The following table summarises the above information :—

Row.	Tree.	Spray Compound Used.	Dates when Sprayed.	Number of Diseased Leaves on each Tree.
1	1	Bordeaux Mixture	Aug. 19th	14
	2		and	0
	3		Sept. 6th	0
2	4	Burgundy (copper soda)	Aug. 15th	0
	5		and	0
	6		Sept. 6th	0
3	7	Bordeaux Paste.....	Aug. 19th	0
	8		and	0
	9		Sept. 6th	0
4	10	Copper sulphate solution ...	Aug. 15th	0
	11			0
	12			0
5	13	Bordeaux mixture	Aug. 19th	10
	14			0
	15			0
6	16	Burgundy (copper soda)	Aug. 15th	0
	17			0
	18			0
7	19	Bordeaux paste	Aug. 19th	94
	20			43
	21			21
8	22	Copper sulphate solution ...	Aug. 15	0
	23			10
	24			7
9	25	Bordeaux mixture	Aug 19th	0
	26		and	0
	27		Sept. 6th	0
10	28	Burgundy (copper soda) ...	Aug. 15th	0
	29		and	0
	30		Sept. 6th	0
11	31	Bordeaux paste	Aug. 19th	0
	32		and	0
	33		Sept. 6th	0
12	34	Copper sulphate solution ...	Aug. 15th	0
	35			0
	36			0
13	37	Soil dressed with $\frac{1}{2}$ lb. iron sulphate per tree	Aug.	95
	38			88
	39			142

Further condensed, these figures show :—

6	trees	sprayed	twice	with	Bordeaux	mixture	yielded	14	diseased	leaves.
3	"	once	"	"	"	"	"	10	"	"
6	"	twice	"	"	Burgundy	(copper soda)	"	0	"	"
3	"	once	"	"	"	"	"	0	"	"
6	"	twice	"	"	Bordeaux	paste	"	0	"	"
3	"	once	"	"	"	"	"	158	"	"
9	"	once	"	"	Copper sulphate	solution	"	17	"	"
3	"	unsprayed, but each dressed with $\frac{1}{2}$ lb. iron sulphate in the soil above the roots								" 325 "

With the exception of row 7, sprayed once with Bordeaux paste, these results may be considered highly satisfactory, as far as protecting the trees against

leaf curl fungus is concerned. The copper soda compound has in this instance proved more completely satisfactory than in any other case where, to my knowledge, it has been used in the field against this disease. Since this trial started I have become acquainted with the investigations made by Mr.



FIG. 2.

Another Unsprayed Two-Year-Old Elberta Tree, Dressed with Iron Sulphate at the Roots.

Pickering, at Woburn, England, into this particular wash. That investigator points out that the correct quantity of soda to react with the copper sulphate is represented by one part of the copper to 1.84 of the soda, which, reduced to common terms, would imply 11b. of copper sulphate to 11b. 13½ozs. of carbonate of soda. The quantity used at Blackwood, viz., 11b. to 1½lbs., falls short

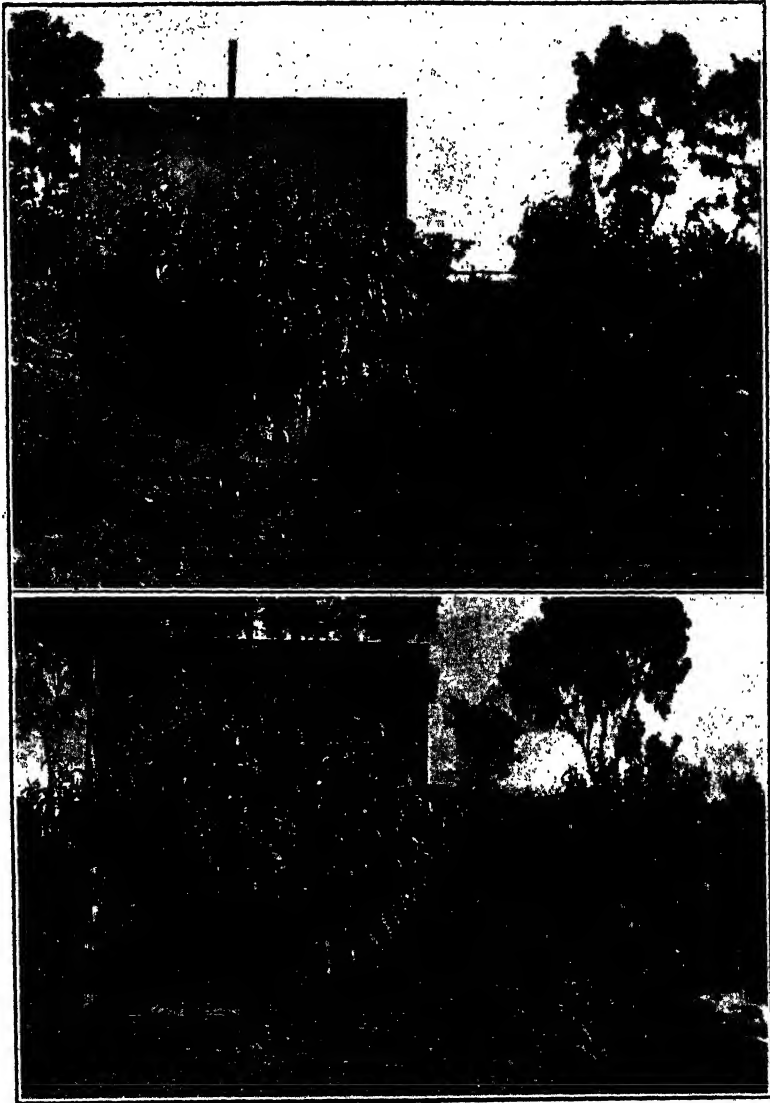


FIG. 3.
Typical Three-Year-Old Elberta Trees in the Spraying Test.

in soda, and therefore doubtless left some copper sulphate free in solution. The greater success of this spray may after all be attributable to the immediate availability of this uncombined copper more than to any subsequent reaction releasing copper from the mixture formed by the union of the copper and soda compounds. The uniform effectiveness displayed by the pure solution of copper sulphate certainly tends to lend color to this view.

Referring again to row 7, containing the three trees on which Bordeaux paste was used, the large number of diseased leaves indicate that a very tangible cause, other than the absence of the second spraying, must be accountable for this sudden reversion of results. On several occasions prior to the diseased leaves being plucked the writer carefully examined these trees and noticed that nearly all of the diseased leaves were attached in masses to certain twigs or branches. This was more particularly the case with tree No. 19, where one main branch seemed to carry scarcely a sound leaf. This branch was enclosed in the body of the tree to such an extent that an attempt to display it in a photograph had to be abandoned. A close scrutiny of the bark and buds failed to reveal any of the signs of spray wash which could be detected on the other trees, though faintly, which were sprayed with this paste.

A comparison of the readiness with which these compounds can be mixed and applied to the trees indicates that the Bordeaux paste is the simplest to mix; the sulphate of copper solution comes next, the copper soda following, and the ordinary Bordeaux mixture proves not only the most troublesome to make but the most vexatious to apply. It has, however, the saving quality of showing clearly which parts of the tree have been coated by the spray.

The writer intends to repeat this test during the present season (1911), and in the meantime suggests caution against accepting too fully the results obtained thus far. If any recommendation is made, it is in the direction of suggesting that orchardists should experiment with the Bordeaux paste. Its simplicity and time-saving qualities are all that could be desired, and if properly compounded, it should be possible for the veriest novice to avoid mistakes and secure more uniform results than have been possible with the use of standard Bordeaux mixture.

In justification of this recommendation I beg to again refer readers to the splendid researches of Mr. Spencer Pickering, as contained in the eleventh report of the Woburn Experiment Fruit Farm, in which he points out that Bordeaux mixture, made by mixing lime and copper sulphate (bluestone), gives rise to a number of different compounds, according to the proportions of the ingredients used. The greater the proportion of lime used the more of the copper sulphate will be thrown out of action and possibly wasted, as the Bordeaux mixture depends for its fungicidal value upon the copper sulphate being again reproduced in soluble form by the action of the carbon dioxide from the air combined with the moisture upon the leaf. The excess

of lime in the form of lime sulphate absorbs this gas greedily, preventing it from acting upon the copper compound on the leaf, and thus delaying the commencement of the fungicidal action. To economise material, therefore, and to secure some immediate advantage, the least quantity of lime consistent

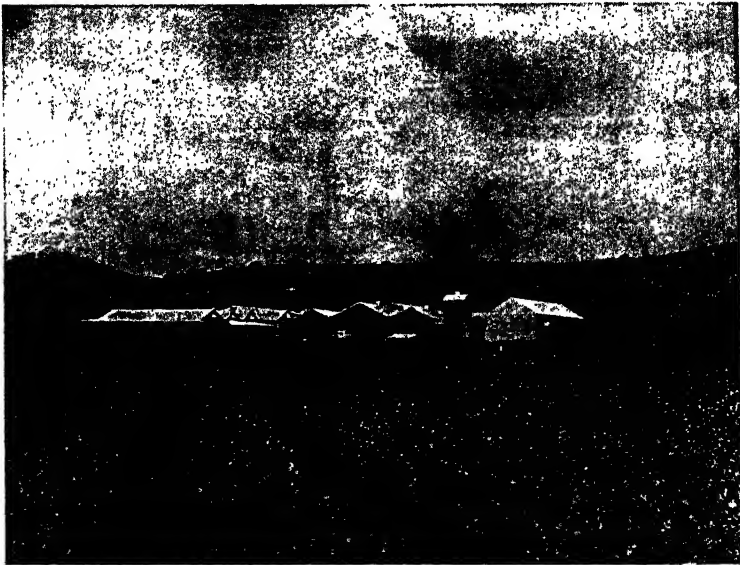


FIG. 4.

Two-Year-Old Elberta Tree, Sprayed Once with Copper Sulphate.

with throwing down all of the copper should be used in the mixture. Mr. Pickering has shown how this may be accomplished by the use of limewater only and the ferro-cyanide of potash test. The paste he has invented possesses this qualification.

Actual tests have shown that the relative efficiency of this Woburn paste and ordinary Bordeaux mixture, in so far as the liberation of copper sulphate is concerned, is as 20 to 1, and at a low estimate in practice he considers it may be taken as 12 to 1. Although differently compounded, Messrs. Bickford's chemist assures me repeated laboratory tests made by passing carbon dioxide through a diluted mixture of their paste (as recommended for spraying, viz., 2lbs. to 50galls. of water) liberates an equivalent of 5½ozs. of copper sulphate. This would equal the full amount of copper sulphate liberated from 50galls. of Bordeaux made on the formula used in this trial, whilst its effectiveness should be more quickly available, besides possessing all of the advantages realised in manipulation.



VINEYARD AND WINE-CELLARS.

THE WHEAT MARKET.

Wheat prices remained fairly steady during July, with values 1d. to 3d. a bushel higher in Melbourne and Sydney than they were at Port Adelaide.

"The market has been steady in tone during the past week," says *Beerbohm's Evening Corn Trade List* of June 30th, "and previous prices have been paid for wheat in near positions, but there is no improvement in the demand for distant shipments. The continued unfavorable reports from America regarding crop prospects are believed to be somewhat exaggerated. What may be described, on the whole, as a favorable outlook for the European crops and the near approach of harvest tend to counteract, at any rate for the time being, the impairment of crop prospects in America. Moreover, the area sown in the United States and Canada being distinctly larger than last year, an appreciable decline in the condition of spring wheat, compared with June 1st, can take place and still leave a total production materially larger than last year. Whatever the final result may be, it is quite certain that until the wheat is actually harvested crop scares, genuine or otherwise, will be cabled over from time to time. From Russia the latest advices are generally favorable regarding the prospects of the spring wheat crop. . . . Trade generally, as is often the case just before harvest, continues of a hand-to-mouth character."

In considering probable wheat prices during the next year or two due weight must be given to the greatly increased areas which are going under crop in Canada, Argentine, and Australia. It is quite possible that these fresh areas may for a time counterbalance the enormous increase of population which is taking place, especially in the new countries, and so prevent prices from rising to any large extent. On the other hand, consumption of wheat is increasing in many parts of Europe where 20 years ago the working classes never dreamt of eating anything better than rye bread, and of course a poor harvest in any of the great producing countries would result in a temporary rise of prices.

The following table gives the total shipments of wheat and flour to Europe since August 1st, 1910, for the past two seasons, with the source of supply:—

	Total 47 weeks, since Aug. 1, 1910. Qrs.		Same period last year. Qrs.
United States and Canada	11,930,000	..	15,285,000
Argentine and Uruguay	8,830,000	..	4,970,000
Russian and Black Sea Ports ...	25,925,000	..	25,565,000
Danubian Ports	10,320,000	..	4,105,000
India	5,545,000	..	3,000,000
Australasia	5,330,000	..	4,240,000
Sundries	1,380,000	..	1,615,000
	<hr/> 69,260,000		<hr/> 58,780,000

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
July 10	Market steady	3/3	3/5 to 3/5½	3/4½ ; millers, 3/6
11	—	Do.	3/5	Do.
12	Very dull ; 4/2½d. off coast	Do.	3/4½ to 3/5½	Do.
13	Quiet ; Liverpool dull	Do.	3/3½ ex. store	3/4 ; millers, 3/5½
14	Sellers at 4/3	Do.	3/5	Do.
15	Dull, with easier tendency	3/2	Do.	Do.
17	Dull ; Liverpool offers lower	Do.	3/4½	Do.
18	—	Do.	Do.	Do.
19	Steadier tone	Do.	Do.	3/3 ; millers, 3/4
20	Dull ; sellers at 4/3	Do.	Do.	Do.
21	Dull ; sellers at 4/2½	Do.	Do.	Do.
22	Firmer ; April, 4/1½	Do.	Do.	Do.
24	—	Do.	3/5	3/5½
25	Firm ; 4/2½ arrived wheat	Do.	Do.	Do.
26	Firm ; 4/2½ off coast	3/3	Do.	3/4½
27	Liverpool steady but quiet	Do.	Do.	Do.
28	Firmly held but inactive	Do.	Do.	3/4½ to 3/5½
29	Steady, but quiet	Do.	Do.	Do.
31	—	Do.	3/5½	Do.
Aug. 1	Firm, but quiet	Do.	3/5	Do.
2	Steady, but quiet	Do.	Do.	3/5 to 3/5½
3	Firm	Do.	Do.	Do.
4	Very firm ; March-April, 4/3½	3/4	3/6	3/6
5	Firm	Do.	Do.	Do.

STEAMER FREIGHTS.—Steamers from South Australia to United Kingdom—Continent, full cargo rates, 25s. to 25s. 6d. per ton (8d. to 8½d. per bush.). Parcels, Port Adelaide to London-Liverpool, 22s. 6d. per ton (7½d. per bush.) ; to Continent, 23s. 9d. per ton (7½d. per bush.) ; Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.) ; to Sydney, 10s. 6d. per ton (3½d. per bush.).

SAILER FREIGHTS.—From South Australia to United Kingdom—Continent, 24s. 6d. to 25s. per ton (7½d. to 8d. per bush.) ; to South Africa, 20s. per ton (6½d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for July, 1911, at the undermentioned stations, also the average total rainfall for the first seven months in the year, and the total for the first seven months of 1911 and 1910 respectively :—

Station.	For July, 1911.	Av'ge. to end July.	To end July, 1911.	To end July, 1910.	Station.	For July, 1911.	Av'ge. to end July.	To end July, 1911.	To end July, 1910.
Adelaide	1.97	12.67	9.04	15.74	Hamley Bridge	1.61	9.67	8.58	13.15
Hawker	1.49	6.85	5.00	11.79	Kapunda....	1.64	11.56	9.77	14.61
Craddock	1.40	6.28	4.28	9.95	Freeling.....	1.77	10.34	9.16	13.68
Wilson.....	1.21	6.86	3.67	12.61	Stockwell ...	2.43	11.70	11.21	13.29
Gordon	1.30	8.72	3.99	6.50	Nuriootpa...	1.76	12.28	8.95	15.36
Quorn	1.85	7.69	4.86	11.43	Angaston ...	3.05	12.44	13.88	17.12
Port Augusta	0.46	5.50	4.80	10.91	Tanunda....	2.79	12.84	15.13	16.61
Port Germein	0.42	7.30	5.79	12.56	Lyndoch	2.23	13.43	11.44	15.77
Port Pirie ...	1.57	7.61	8.48	16.43	Mallala	2.20	9.97	9.08	13.06
Crystal Brook	1.45	8.68	8.93	13.56	Roseworthy .	1.29	10.22	7.97	14.23
Pt. Broughton	0.78	8.48	8.51	12.77	Gawler	1.44	11.42	8.83	14.78
Bute	1.83	9.16	10.89	15.89	Smithfield ..	1.32	9.93	9.35	15.07
Hammond ..	1.24	6.18	7.51	10.28	Two Wells ...	1.13	10.31	7.01	12.56
Bruce	1.08	5.17	3.62	10.57	Virginia.....	1.30	10.58	8.21	15.08
Wilmington .	2.29	10.20	9.77	16.14	Salisbury....	1.81	11.13	11.00	16.47
Melrose	2.09	13.62	10.53	21.87	Teatree Gully	2.07	17.00	12.65	19.29
Booderoo Cntr	1.06	8.92	6.17	13.26	Magill	2.50	15.69	12.73	16.41
Wirrabara...	1.76	10.87	7.85	16.57	Mitcham ...	2.57	14.66	11.66	15.13
Appila	1.29	8.35	7.47	16.21	Crafers	5.97	27.69	27.55	32.85
Laura	1.73	9.96	9.14	17.79	Clarendon ...	2.82	20.47	18.32	20.18
Caltowie	1.15	9.47	9.63	13.08	Morphett Vale	1.93	14.26	11.85	15.75
Jamestown..	1.87	9.47	11.08	13.58	Noarlunga....	1.87	12.40	12.23	14.69
Gladstone ..	1.15	8.76	9.48	11.28	Willunga ...	3.43	15.79	17.11	19.31
Georgetown .	1.26	10.50	9.94	13.44	Aldinga	1.88	12.53	10.88	15.75
Narridy	1.55	9.64	10.23	12.58	Normanville.	2.50	12.84	12.11	17.91
Redhill	1.24	9.56	8.58	17.54	Yankalilla...	2.82	14.15	14.13	25.35
Koolunga ...	1.28	9.00	8.50	16.46	Endunda.....	2.57	9.58	10.40	20.93
Carrieton ...	1.56	6.63	5.35	13.36	Sutherlands .	1.53	5.44	6.56	10.83
Eurelia	1.24	7.18	5.81	12.36	Truro	2.02	11.06	10.75	15.87
Johnsburg ..	1.41	5.26	4.71	10.20	Palmer	1.16	—	6.93	13.35
Orroroo	1.31	7.84	5.14	11.34	Mt. Pleasant.	2.64	16.07	13.83	18.35
Black Rock..	1.11	6.83	6.06	11.82	Blumberg ...	2.82	17.83	14.37	19.38
Petersburg ..	1.13	7.12	7.07	10.33	Gumeracha...	3.11	19.57	17.46	21.85
Yongala	1.84	7.44	7.80	10.29	Lobethal.....	4.33	21.27	19.25	22.63
Terowie	1.10	7.28	7.09	13.22	Woodside ...	4.99	18.44	19.04	23.26
Yarcowie	1.61	7.62	8.16	13.07	Hahndorf ...	4.45	20.68	22.32	35.16
Hallett	2.23	9.10	9.37	11.12	Nairne	3.27	16.95	19.54	22.15
Mount Bryan	1.72	8.91	8.04	13.22	Mt. Barker ..	3.40	18.21	18.74	21.72
Burra	2.03	10.23	10.11	15.53	Echunga	3.77	19.39	21.78	24.66
Snowtown...	1.45	9.13	6.99	14.09	Macclesfield .	4.11	17.59	19.45	23.99
Brinkworth..	1.20	8.52	8.44	14.97	Meadows	4.42	20.86	22.77	27.24
Blyth.....	1.67	9.48	9.11	12.85	Strathalbyn .	2.49	11.27	12.62	16.36
Clare	2.09	4.22	12.27	20.43	Callington ..	1.31	9.32	8.50	12.30
Mintaro Cntrl.	2.82	12.49	12.53	16.83	Langhorne's B	1.20	8.95	7.94	17.32
Watervale...	2.99	15.83	15.02	18.77	Milang	0.97	10.31	6.06	9.71
Auburn	2.74	14.07	13.97	20.52	Walleroo	1.57	8.65	10.00	12.69
Manoora	1.99	10.07	9.11	13.89	Kadina	2.31	9.94	9.65	12.51
Boyleton	1.80	10.74	10.42	11.60	Moonta	1.72	9.62	8.49	10.52
Balaklava...	1.96	9.43	9.57	13.10	Green's Pms..	1.02	9.52	6.87	12.24
Pt. Wakefield	1.76	8.15	11.59	10.65	Maitland....	2.52	12.41	12.72	13.25
Saddleworth.	2.26	11.70	9.68	14.75	Ardrossan...	1.60	8.43	8.46	10.02
Marrabel....	2.18	10.91	8.36	14.30	Pt. Victoria..	1.68	9.50	10.47	10.77
Riverton....	2.42	11.86	11.47	18.09	Curramulka .	1.84	11.42	9.99	13.13
Tarlee	1.66	10.04	8.56	14.16	Minlaton....	2.03	10.70	9.48	13.17
Stockport ...	1.51	9.39	7.39	10.73	Stansbury ..	2.58	10.28	10.88	13.40

RAINFALL TABLE—*continued.*

Station.	For July, 1911.	Av'ge. to end July.	To end July, 1911.	To end July, 1910.	Station.	For July, 1911.	Av'ge. to end July.	To end July, 1911.	To end July, 1910.
Warooka....	2.76	10.93	12.70	14.26	Bordertown .	1.73	11.26	9.77	12.12
Yorketown .	1.86	10.70	10.09	13.70	Wolseley....	1.62	9.89	9.99	12.98
Edithburgh..	1.73	10.15	8.73	14.67	Frances....	2.38	11.14	13.41	13.75
Fowler's Bay.	1.91	8.30	7.78	7.35	Naracoorte .	2.21	12.80	13.59	15.55
Streaky Bay.	1.77	9.98	10.16	11.87	Lucindale ...	3.31	13.47	16.23	18.61
Pt. Elliston..	2.68	10.56	12.12	13.33	Penola.....	3.61	15.25	17.49	19.90
Pt. Lincoln..	3.28	12.44	12.04	14.87	Millicent	4.02	17.74	22.07	22.46
Cowell	0.80	7.00	7.05	8.82	Mt. Gambier.	3.68	18.34	21.45	25.03
Queenscliffe .	—	11.61	—	25.72	Wellington ..	0.85	8.80	7.90	12.19
Pt. Elliot....	2.22	12.53	10.28	14.29	Murray Bridge	0.83	8.27	6.68	15.08
Goolwa	2.35	10.76	11.38	14.55	Mannum	0.50	7.00	2.83	12.50
Meningie....	1.95	11.39	9.51	12.59	Morgan	0.81	4.92	5.28	7.75
Kingston....	2.90	15.18	14.60	17.58	Overland Crnr	0.90	6.20	7.60	10.49
Robe	3.26	5.39	16.69	19.93	Renmark ...	0.59	5.71	7.18	8.90
Beachport....	4.25	17.21	20.79	23.61	Lameroo ...	—	—	—	10.99
Coonalpyn ..	1.31	10.24	9.36	10.14					

TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of 3,500 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on August 1st—

BUTTER.

The weather conditions have not been very favorable during the month, and the season is not so far advanced as at the same period last year, but the supply of cream is increasing steadily, and as the quality is up to the usual standard the butter is in great demand. The present prices are as follows:—Superfine, 1s. 2d.; pure creamery, 1s. 1d.

Messrs. A. W. Sandford & Co. report on August 1st—

BUTTER.—A brisk month's business was experienced, and the rooms were kept well cleared of all choice lines of creamery, factory, best separator, and dairy, the only dragging lots being off-quality creamery and secondary factory makes. Best factory and creamery, fresh in prints, 1s. to 1s. 2d.; second-grade factories, 10d. to 11d.; choice separators, dairies, 11d. to 1s.; medium quality lots, 8½d. to 9½d.; store and collectors', 7½d. to 8½d.

EGGS.—The seasonable increase in quantities has set in, but owing to the influence of steady inter-State orders, no abrupt lowering took place. Prime guaranteed new-laid hen, 11½d.; duck, 1s. per doz.

CHEESE.—New season's makes are now supplying trade requirements, and values record a slight advance for all established brands. Mild flavored new makes, 6d. to 7d.

BACON.—Factory-cured sides, middles, and rolls are experiencing a very fair turnover, but hams are quiet. Sides, 6d. to 7d.; middles, 7d. to 8d.

HAMS.—In calico, 8d. to 8½d.

LARD.—Values easier. In skins, 5½d.; bulk, 5d.

HONEY.—Well flavored clear extracted readily saleable at 2d.; beeswax, 1s. 2d.

LIVE POULTRY.—Although pennings were heavy, brisk competition enabled selling rates to maintain. Good table roosters, 3s. to 4s.; plump cockerels, 2s. to 2s. 6d.; hens and light cockerels, 1s. 6d. to 2s.; ducks, 2s. 6d. to 3s. 6d.; geese, 4s. to 4s. 6d.; pigeons, 7d.; turkeys, 7d. to 10d. per lb. live weight, for fair to good table birds.

POTATOES.—Under the influence of heavy demand Gambiers firmed; £4 12s. 6d. to £4 15s. on trucks, Adelaide or Port, per ton of 2,240lbs.

ONIONS.—A strong market rules for these at advance in rates; £5 10s. to £5 15s. on trucks, Adelaide or Port, per ton of 2,240lbs.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Aug.	Sept.			Aug.	Sept.
Amyton	73	8	5	Millicent	99	8	12
Angaston	80	5	9	Miltalie	88	5	9
Appila-Yarrowie	*	—	—	Minlaton	85	12	16
Arden Vale & Wyacca	73	—	—	Mitchell	88	12	9
Arthurton	*	—	—	Monteith	*	—	—
Balaklava	†	—	—	Moonta	*	—	—
Beetaloo Valley	*	—	—	Morehard	75	—	—
Belalie North	†	5	2	Morgan	†	5	9
Blyth	81	8	12	Morphett Vale	95	—	—
Bowhill	*	—	—	Mount Bryan	78	5	2
Bowmans	*	10	7	Mount Bryan East ..	78	5	2
Bute	†	8	5	Mount Gambier	99	—	—
Butler	†	—	—	Mount Pleasant	96	11	8
Caltowie	†	5	2	Mount Remarkable ..	75	9	6
Carrieton	73	10	7	Mundoora	†	—	—
Cherry Gardens	92	8	5	Murray Bridge	*	—	—
Clare	82	4	8				
Clarendon	93	7	4	Nantawarra	†	9	6
Colton	†	12	9	Naracoorte	99	12	9
Coomooroo	74	—	—	Narridy	79	—	—
Coomalpyne	†	—	—	Northfield	82	8	5
Craddock	†	—	—				
Crystal Brook	*	—	—	Parrakie	91	5	2
Cummins	*	5	9	Paskeville	†	10	7
Davenport	*	—	—	Penola	†	5	2
Dawson	74	—	—	Penong	89	12	9
Dingabledinga	93	11	8	Petina	89	—	—
Dowlingville	*	—	—	Pine Forest	85	8	5
Elbow Hill	86	—	—	Port Broughton	*	11	8
Forest Range	94	10	7	Port Elliot	96	19	16
Forster	*	—	—	Port Germein	*	—	—
Frances	*	4	8	Port Pirie	*	5	6
Freeling	82	—	—	Quorn	76	5	—
Gawler River	*	—	—	Redhill	79	8	5
Georgetown	77	12	9	Renmark	*	—	—
Geranium	*	26	30	Saddleworth	83	18	15
Green Patch	56	7	4	Salisbury	†	1	5
Gumeracha	94	7	4	Shannon	89	—	—
Hartley	94	5	—	Sherlock	*	12	9
Hawker	*	7	11	Stockport	*	—	—
Hookina	74	5	9	Strathalbyn	†	21	4
Kadina	*	10	7	Sutherlands	*	—	—
Kalangadoo	†	12	9	Tatiana	†	5	2
Kanmantoo	94	5	2	Uraidla and Summert'n	96	7	4
Keith	97	12	9	Utera Plains	90	5	2
Kingscote	†	1	5	Waikerie	†	—	—
Kingston	98	26	30	Watervale	*	—	—
Koppio	88	10	7	Wepowie	*	—	—
Kybybolite	*	10	7	Whyte-Yarrowie	†	5	16
Lameroo	*	—	—	Willowie	†	—	1
Lipson	*	—	—	Willunga	97	—	2
Longwood	†	9	6	Wilkawatt	92	5	—
Lucindale	98	—	16	Wilmington	†	9	6
Lyndoch	†	—	—	Wirrabara	76	—	—
Maitland	84	3	7	Woodside	97	—	—
Mallala	†	7	4	Yadnarie	91	4	9
Mannum	*	26	30	Yallunda	*	—	—
Meadows	95	7	4	Yongala Vale	79	5	9
Meninting	25	12	9	Yorketown	*	12	9

* No report received during the month of July.
† Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by GEORGE G. NICHOLLS.

[A number of reports of meetings which only dealt with the annual report have been classed as formal in this issue owing to lack of space. Where the subjects discussed have been named by Hon. Secretaries, they have been inserted.]

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

Amyton, June 14.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Cormack (chair), Brown, Griffin, Crisp, Corcoran, Baumgurtel, Thomas (Hon. Sec), and one visitor.

WARY SPARROWS.—In discussing the question of sparrow destruction, some members said that it was often impossible to get the sparrows to touch poisoned wheat at all. On other occasions where the poison was strong a few birds died on the spot, and others became wary at once.

Arden Vale and Wyacca, July 10.

(Average annual rainfall, 16 in.)

PRESENT.—Messrs. Eckert (chair), J. H. Williss, A. Eckert, E. Klingberg, W. Klingberg, P. Hannemann, O. E. Hannemann (Hon. Sec), and several visitors.

KEEPING WILD OATS IN CHECK BY CULTIVATION.—A paper was read by Mr. Williss under this title. He said that deep ploughing failed to clean the land of wild oats. The difficulty was to get the oats to germinate if the land was not worked prior to the first rains. For dirty stubble lands he would put the skim plough over the land in February or March, in fact any time that was most convenient after the stubble was burnt, but before the first rain fell. About three weeks after the rain cross-harrow it, and then leave it until ready to fallow. By this method he got a good germination and much more feed; whereas if the land was left undisturbed until ready to fallow the majority of the seeds were on top and failed to germinate. If it was not convenient to work the land in the above manner he would skim plough about 2 in. deep immediately after seeding, then leave it for two or three weeks and cross-harrow it. His reason for not harrowing at once after ploughing was that on account of the oats being so light the harrows would turn a lot of the seed to the surface that would otherwise germinate if left under the ground. It was not wise to lay down hard and fast rules in regard to depth and time to fallow. The class of land had to be considered and also the rainfall. Four inches was a fair average depth for this district. Not so much depended on the depth of ploughing as upon the amount of work put into it afterwards. He advised harrowing as soon as possible after the ploughing, and repeat the operation after every rain if possible. In respect to cultivating the fallow, if there was only sufficient time to go over it once, he would do it towards the end of August or early in September.

Carrieton, July 6.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Ormiston (chair), Manning, Beerworth, Williams, Earl, Radford, and Bock (Hon. Sec.).

WILD DOGS.—In view of the damage being done by wild dogs, it was decided that the district council of Carrieton should be asked to take steps to exterminate them.

RABBIT DESTRUCTION.—A demonstration of Messrs. Finlayson & Cousins' patent rabbit-destroyer was given before the members of the Branch by Mr. Cousins, in a

paddock adjacent to the township. Mr. Manning had obtained the right to use this method on 5,000 acres of land, and had already cleared the rabbits out of 1,000 acres. He spoke very highly of the patent.

Coomooroo, July 8.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Berryman (chair), Avery, E. Brice, E. C. Brice (Hon. Sec.), and three visitors.

ANNUAL MEETING.—The Hon. Secretary presented his annual report. Twelve meetings had been held, with an average attendance of seven members. Interesting papers had been read and very helpful discussions had taken place. The average attendance had been affected by the rough weather which had prevailed on occasions when meetings were arranged; but the year's work was, on the whole, satisfactory. •

Dawson, June 10.

(Average annual rainfall, 10½in.)

PRESENT.—Messrs. Meyers (chair), Burden, Wilson, Hughes, Meyers, and Nottle (Hon. Sec.).

NOXIOUS WEEDS.—The following resolution was passed:—"That this Branch strongly objects to the destruction of Salvation Jane as a noxious weed, as it is considered a valuable fodder plant; but consider that star thistle and burr should be destroyed." It was decided to bring the matter before the district council.

Dawson, July 8.

(Average annual rainfall, 10½in.)

PRESENT.—Messrs. Meyers (chair), Baker, Smart, Ferguson, S. Smart, Nottle (Hon. Sec.), and one visitor.

EARLY & LATE FALLOWS.—Mr. E. W. Smart said that a few years ago he had started fallowing very early, but could not get enough fallowed owing to lack of rain. He ploughed some in the summer and found that at harvest time the late fallow yielded several bushels more than the early fallow. In addition to his own he had noticed that several others had obtained similar results. Mr. Ferguson preferred to fallow early and cultivate his land, working it as well as possible. Where one had to fallow a large area it was necessary to start early or one would not be able to get on with cultivating before the weeds were getting the upper hand. He worked the fallow down very smooth. Other members preferred to leave it rather in its rough state. Land left too smooth was liable to become hard in this district, and water would run off it. These patches would be bare all the year.

ROLLING HAY LAND.—Some discussion on this subject took place. Those who had rollers believed in rolling the loose soil, but not the hard ground, as this would cake too easily. Other members thought harrowing gave better results.

Hookina, July 8.

PRESENT.—Messrs. B. Sheridan (chair), P. and T. Kelly, P. and B. Murphy, L. Woods, S. and F. Stone, J. Henschke, jun., Carn, and Hadigan (Hon. Sec.).

FENCING.—Mr. B. Murphy read the following short paper on this subject:—"The fencing required in any district depends to a great extent upon the class of stock kept. It is always advisable to put up a good fence and to keep it in repair. Four feet is a good height. Posts should be 18in. in the ground and from 12ft. to 15ft. apart. Strainers should be 2ft. 6in. in the ground and about 3in. higher than the other posts. When vermin-proof fences are required, 42in. netting with 1½in. mesh should be used, with three plain wires and a barb. The plain wires should be run as follows:—Bottom wire 1ft. 6in. from the ground, second 3ft. 2in., and the third 3ft. 7in., the barbed wire should be put on top of the posts. The netting, when put 4in. in the ground, can be fixed to the 3ft. 2in. wire with ties about 1yd. apart. The trench can be ploughed in most places. Gum

and black oak posts last better than others in this district. The white ants eat the gum posts quicker than the black oak, though the gum will last longer when these pests leave them alone. Wooden posts, in this district, are nearly as cheap as iron posts." Considerable discussion took place on the matter contained in the paper. Members were generally of the opinion that more wires should be used in the fence below the top of the netting.

Morchard, July 15.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. McDougall (chair), Reichstein, Kupke, Jasper, Munro, Loftes, Parsons, Scriven, Muller, Leskie, McCallum (Hon. Sec.).

INSURANCE OF HORSES.—Mr. McCallum read a paper on this subject. He did not think it would pay the farmer to insure the average horse, but it was advisable to insure mares expected to foal. He objected to the terms of some of the policies issued, because no difference was made between premiums charged for light or heavy draught stock. Some companies also charged a heavier premium when the mare reached the age of 10 years. He contended that the risk was no greater with a mare accustomed to rearing foals after she reached the age of 10 years than it was prior to her reaching that age. The companies provided no veterinary attendance, and money which the policy holder spent in a successful effort to save a mare was not recouped by the company. The premium charged was 10 per cent. On an average valuation of £45 per mare the annual premium would be £4 10s. In the event of the death of a mare two-thirds of the value was received from the company. After the £4 10s. premium was deducted, £25 10s. was left to replace a horse valued at £45. In the discussion which followed, members generally agreed that it did not pay to insure the average horses, and could not see that the risk of loss was greater on a mare accustomed to breeding after she reached the age of 10 years. Mr. Scriven favored insuring valuable stallions. Mr. Kupke believed in insuring mares expected to foal.

RAILWAY DEMURRAGE RATES.—After considerable discussion on this subject the following resolution was passed:—"That this Branch strongly objects to the demurrage rates now charged at country railway stations." On account of so many settlers living from 12 to 20 miles from the station it is impossible for them to get their goods, and no notice of arrival of goods is served.

Mount Remarkable, July 5.

(Average annual rainfall, 21 in.)

PRESENT.—Messrs. Bauer (chair), McIntosh, Giles, Davie, and Casley (Hon. Sec.).

NOXIOUS WEEDS.—The following resolution was passed:—"This Branch is of opinion that the Act will never be satisfactorily administered by district councils, owing to their individual members being amongst the worst offenders, and their natural disinclination to visit the penalties of the law upon their constituents. Therefore this Branch suggests that the administration of the law be vested in the officers of the Crown."

HANDLING AND TRANSPORT OF POTATOES.—Mr. Casley read the following paper:—"The present system of handling potatoes, in this State is not only injurious to the tubers, but very slovenly: in fact, under the present system one of our best and most highly-prized articles of diet is often in a state of decomposition before it reaches the consumer. This is especially so if brought by rail from Mount Gambier. The reason is that the bags are usually stacked tons upon tons on top of each other. The treatment the potato receives in the west of England and the Channel Islands, where thousands of tons of prime potatoes are delivered annually in first class condition to Bristol, London, Birmingham, and other big markets, with not a bruise on them, is very different. The potatoes are carefully dug, sized, and carefully packed in baskets of the following dimensions:—20 in. across the top, 18 in. deep, 12 in. across the bottom. These baskets are round, and are provided with two handles, and are lined with strong brown paper. They are then carefully filled and slightly rounded off on top. A paper cover is put on, then straw on top of the paper. The straw is then secured by twine sewn across the top and interlaced to prevent it from shifting. The weight of a full basket is about 56 lbs. I have seen some thousands of baskets filled and handled in this way, and I know that the potatoes reach their destination in perfect condition. If this system were started in Australia I feel sure that, instead of people in the North getting an inferior article as they often do now, they would have an article which could be enjoyed. I am not in a position

to state where the necessary cane can be grown to make these baskets, but I am given to understand that it can be grown in abundance in our swamp country. The advantages of baskets are many. They last almost a lifetime; when empty they can be stacked in each other in parcels of five to 10 with a string through the handles to hold them together. The whole matter demands our attention, and I should like to see it thoroughly threshed out." Discussion was postponed until next meeting.

Quorn, July 8.

(Annual average rainfall, 13½ in.)

PRESENT.—Messrs. Thompson (chair), Noll, Cook, Britza, Brewster, Patten (Hon. Sec.), and two visitors.

TIME OF SEEDING.—This subject was dealt with in a paper by Mr. Brewster. He said it was better in the North to sow half the fallow prior to April 1st than to wait for the rain. The main reason for this view was that if he waited for the rains to commence, in this part of the State, a farmer might have his seeding delayed right into May, and then have several inches of rain in a few days. It would not be possible to get on with the drill for several days more, and it would be a difficult matter to get all the crop in at the proper time. The fallow that had been drilled could be harrowed over after the rain had fallen. Members generally agreed with this opinion, and that early crops usually proved the best in this district, provided that the land was kept free from weeds.

Wirrabara, June 10.

(Average annual rainfall, 30 in.)

PRESENT.—Messrs. Woodlands (chair), Curnow, P. and H. Lawson, Thistleton, Bowman, Pitman, Woodlands, Hoskins, W. and E. J. Stevens, E. J. and G. Hollett, Smith, Marner, Kendrick, H. Lawson (Hon. Sec.), and three visitors.

CARE OF HARNESS.—A paper to the following effect was read by Mr. Hoskins:—"As a general rule not enough attention is paid to harness. The one thought is to get as much as possible out of it with a minimum of effort towards care of it. This is very poor economy, as a few shillings spent on the harness at the right time would mean the saving of pounds. When not in use, hang the wipers up by the head strap out of the way of the horses. Of the two sorts of collars, the pipe and the round throat collar, the pipe collar is the better. It maintains its shape longer and fits the horse better. A collar that is too loose will, sooner or later, cause sore shoulders. When a horse has a sore on the shoulder, cut the lining of the collar where the sore is located and take some of the stuffing out, then sew the lining up again. This will not injure the collar but will relieve the trouble. Collars should be washed and scrubbed occasionally. All the leather-work of collars and wipers should be greased or oiled when being cleaned. When not in use the collar should be hung up. When a number of horses are kept it is advisable to keep each horse's collar and wipers apart. The hames should be adjusted properly to the collar, as sometimes, through the hames not fitting, considerable trouble is caused."

Wirrabara, July 8.

(Average annual rainfall, 30 in.)

PRESENT.—Messrs. Curnow (chair), P. and H. Lawson, W. H. and E. J. Stevens, Marner, Burgess, Pitman, Woodlands, Bowman, Thistleton, E. and J. Hollett, A. Woodlands (Hon. Sec.), and two visitors.

WELL-SINKING.—A paper to the following effect was read by Mr. Pitman:—"When you have decided on sinking a well, the first thing to do is to locate a course of water. Some claim to do this by the divining-rod, others can locate watercourses simply by taking bearings of the surrounding country. One may learn to locate a course of water by studying the lay of country where water has been found by sinking. Very few can tell the depth at which water will be found. I have known a number of cases where diviners have claimed to tell the depth at which the water would be found, and they have been several feet out. Watercourses very rarely follow a creek. They are sometimes found on a rise. We have two wells (in which there is plenty of first class water) that are several chains away from the surface course. In both cases water was tried for near the surface

course, but unsuccessfully. Underground courses usually travel in a more direct line than the surface course. When you have decided on the exact spot, measure off your wall and sink as deep as you can with pick and shovel. Throw out the dirt before you erect the windlass, as you can get along much more quickly when throwing out with a shovel than when drawing out with the windlass. Next lay some good solid logs across the top, about 2ft. over each side. On top of these place two more pairs of logs in the opposite direction, in order to bring the landing stage well up above the surface for convenience in sinking. It is easier to draw the dirt up with the windlass than it is to carry it up to the heap that will accumulate around the well. When you reach soil that will not require timbering, make your well round, as it is then not so liable to cave in. About 4ft. 6in. across is the best to work in. With a plumb-bob and a piece of stick to keep the right width, you can sink a round well more easily and quickly and straighter than a shaft one, and there is less earth to take out. The time is coming when concrete rings like those used for culverts will be used for wells in place of timber or even bricks; if so, wells will have to be made round. It sometimes happens that when water is reached the supply is not sufficient for requirements, and it is not convenient to sink deeper. In such cases it is a good plan to get a long jumper and jump a hole in the bottom. I have done this on two occasions, and in both instances found that there was a good supply deeper down which, when tapped, rose and increased the supply. If after sinking a good depth water is not struck, try what is below with a jumper before abandoning. In one well that we sank, rock that had to be blasted out was met with 9ft. from the surface. After sinking through this rock about 17ft. and finding no indications of water, we began to despair, as it was slow and expensive work. We decided to jump down a trial hole and find what was below. About 8ft. deeper water was struck by this means. The rock in this well was solid; two of us could only get out 2ft. in a week for the last 10ft. In drilling holes for blasting in a well do not drill them more than about 18in. deep if it is very hard rock. If you put your charge too deep it will be ineffective. If very hard rock is encountered powder will not be strong enough. In such cases gelignite (commonly called fracture) will have to be used. To explode this detonators will have to be used. These are placed on one end of the fuse and then inserted in a plug of fracture which is placed into the hole to be fired. Special care must be taken when handling these things, especially in tamping the charge. Use only wood for tamping, never use iron. Dynamite is an unsuitable explosive to use for well-sinking. The smoke from a charge of this is more injurious than the smoke from a charge of gelignite. I prefer well water to dam water for stock, unless the dam is fenced in and the water drawn or pumped out for them to drink, as they spoil the water when allowed to enter the dam." In discussing the subject, Messrs. Curnow and W. Stevens favored the diving-rod; whilst Messrs. Woodlands and P. Lawson spoke strongly against it.

HAY WHEAT FOR A WET DISTRICT.—In reply to a question as to what was recommended as a good hay wheat for a wet district, the following varieties were mentioned:—White Tuscan, Purple Straw, Marshall's No. 3, and Steinwiedel. Mr. Woodlands had cut from two to three tons of good hay per acre from Gluyas. A small patch of Baroota Wonder had grown to a height of 6ft. 6in. Members desired an expression of opinion on this subject from the department. [The Director of Agriculture recommends White Tuscan, Baroota Wonder, Zealand, Talavera, and Marshall's No. 3.—*Ed.*]

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Georgetown, June 12.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. Higgins (chair), Hill, McAuley, Inglis, McDonald, Fogarty, Bond, Freebairn, Myatt, Page, Myatt, Hill, Thomson, Eyre (Hon. Sec.), and three visitors.

PICKLING SEED WHEAT.—The following paper was read by Mr. Page:—"The most popular fungicide for treating seed wheat, and the one in most general use, is sulphate of copper or bluestone. The efficacy of this solution depends a great deal on how it is used. The smut spores must be brought into contact with the bluestone for a sufficient length of time

to destroy their vitality. Many farmers go to a considerable amount of unnecessary trouble to obtain boiling water to dissolve the bluestone. Bluestone will readily dissolve in cold water if treated as follows:—The necessary bluestone, after being weighed, should be suspended in a thin bag just below the surface of the water, in an hour or so it will be all dissolved, even in the very coldest of weather, without any further attention. If, however, the bluestone is placed at the bottom of the cask it may be weeks before it all dissolves. I find that a 2 per cent. solution (2lbs. to 10galls.) is strong enough. When the wheat is not affected leave the bag one minute in the solution; when it is seen that the seed is bunted leave it under for two minutes. If you pickle stronger than the above with bluestone alone, not in combination with lime or limewater, it very seriously affects the germinating powers of the wheat; as much as half the seed may be destroyed. The easiest way to dip the bag is to fix up a derrick about 8ft. above the cask; a gum tree growing in the yard would be even better. A piece of wire rope, a couple of pulleys, and any sort of a horse that will pull complete the pickling plant. While the bag of wheat is draining your man would have time to get another bag ready. The wheat should be loose in the bag. It is necessary to have a second draining cask, as you can then use the same water that drains from the bags over and over again." In discussing the subject Mr. Fogarty considered one and a half minutes was not long enough to leave the seed in the pickle. A man and strong lad could do the dipping more quickly than it could be done with a horse. Messrs. Clark and Inglis were using fungicide, which had proved satisfactory so far.

QUANTITY OF SEED PER ACRE.—The following paper was read by Mr. Page:—"There are various opinions as to what is the correct amount of wheat to sow per acre. In wet countries farmers sow as much as 1½ bush. to 1¾ bush. to the acre, whereas in dry districts, like Hawker or Port Germein, ¾ bush. is about the average sown per acre. Georgetown may be put down at 1½ bush. to the acre. Most farmers will admit that this amount should be thick enough, providing 65 per cent. to 80 per cent. of the seed grows. What puzzles some farmers, however, is that only about one-tenth of wheat sown appears in places, when in the same paddock, even on the same drill, but on different quality of land, it is quite thick enough. This happens in the wettest of seasons as well as moderate or dry ones. The reason for the non-appearance of the wheat are, firstly, bad or hard land. If rain falls immediately after sowing the ground sets hard, forming a crust on the top which the wheat will not penetrate. To remedy this, harrow after rain. If the wheat is budding harrowing will not injure it, and the crop will come up quite thickly. Another cause in the brown or light-colored land is when the seed bed is too coarse or gravel-like. The rubble-like soil falls in behind the drillholes and covers the seed from view, but not from the dry wind and frosty air that we experience alternately. The grains germinate only to be nipped in the bud or dried off. Again rain falls; another start, but the air penetrates the coarse covering and the wheat ultimately fails, hence a thin crop. In this kind of land let the drill in a notch and put the wheat about 2½ in. or 3 in. under the surface. Harrowing after drill will also be an improvement in this case. In fine loam or sandy soil if the seed is buried only ½ in., or barely covered, almost every grain will start. If the land is at all coarse bury the seed well. These faults are found mostly in old land or land that has been cropped for a number of years." Members generally agreed that it was desirable to harrow red land after rain.

"**PHALARIS COMMUTATA.**"—Mr. McDonald produced a sample of this fodder, which had shown excellent growth.

Mount Bryan, July 11.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. Hatherly (chair), Wardle, Schmidt, E. K. and H. G. Collins, Casaratto, Hatherly (Hon. Sec.), and two visitors.

FRUIT CULTURE.—The Horticultural Instructor (Mr. George Quinn) attended the meeting and during the afternoon gave a practical demonstration in the gardens of Messrs. Wardle and Collins. In the evening he delivered a lecture on "Horticulture," which was much appreciated by members.

Mount Bryan East, July 8.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. J. Thomas (chair), Gare, Doyle, F. and R. Thomas, Hughes, Tralagan, Wilks, W. and S. Quinn (Hon. Sec.), and one visitor.

THATCHING HAYSTACKS.—Mr. Doyle, in a short paper, recommended members to thatch their haystacks. When a binder was not available, a fair-sized heap of straw should be damped. Then he would make up a number of sheaves. Start at the bottom and work up to the top. This method was preferable to loose straw, as it kept out the rain more effectively. Whip-stick mallee or thick wire should be laid on top of the thatch, with small forked sticks driven into the stack over the top of the same. This made a neat job and held the thatch down. Members agreed that the farmers of this district would be well advised to pay more attention to the protection of their stacks of valuable hay.

Narridy, July 18.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. P. Haren (chair), Darley, Smart, Lehman, Liddle, Satchell, and Kelly (Hon. Sec.).

ANNUAL MEETING.—The Hon. Secretary, in presenting his annual report, said that eight meetings had been held during the year, with an average attendance of eight. The following subjects had been dealt with:—"Land Values from an Agricultural Standpoint," "Wheat for Show Purposes," "Cause of Bare Patches of Soil," "Price of Wheat," "Experimental Plots," "Manures," "Takeall," "Rust," "Assisted Immigration," "Noxious Weeds," "Congress," and miscellaneous subjects.

Redhill, July 4.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. Wheaton (chair), McAvaney, Cox, Coffee, Steele, Gore (Hon. Sec.), and three visitors.

NOXIOUS WEEDS.—Mr. McAvaney read the following paper on "Noxious Weeds":—"Very little notice is being taken of the rapid spread of noxious weeds in this district, and almost every district throughout the State. In this part the most troublesome weeds are the star thistle, turnip, and Canadian thistle. The last is the worst, and is becoming very plentiful. There are many other weeds which should be checked or they will become a great pest. I think our farmers and pastoralists are most careless about keeping their land free from all these weeds. I am of the opinion that our local governing bodies do not insist on the agriculturists looking after these undesirable weeds as they should. The roads and reserves are really the breeding beds for all the weeds, and are badly infested. The seeds will soon scatter from the roads to the paddocks. The sheep carry them, and they are blown by the wind or brought in by waterwashes. I suggest the councils let by tender every possible acre of land they could spare, to be cultivated for, say, five years, on strict conditions that all noxious weeds would be destroyed every year. If this was not done satisfactorily the lease would have to be cancelled. I have heard it said that we shall never be free from these troublesome weeds while we have such large estates as Bundaleer and others at the top of the River Broughton; but I hope that in the near future these large land holdings will be cut up and settled with many farmers who are as anxious to have their land clear from these weeds as we are. In conclusion, I would urge all farmers and pastoralists to co-operate and request the Government to assist the farmers to exterminate all noxious weeds." In a discussion which followed, it was stated that where a fire had occurred in January, some years ago, star thistles decreased considerably, and the effect could still be noticed.

Yongala Vale, July 8.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Lloyde (chair), Miller, Battersby, J. and P. Chigwidden, C. and E. Fowler, Cooper, W. and T. Keatley, Schmidt (Hon. Sec.), and two visitors.

FARMERS' VEGETABLE GARDENS.—Mr. Miller read a paper on the "Farmers' Vegetable Garden," in which he pointed out that many farmers, while devoting their attention to the growing of wheat and rearing of livestock, completely neglected the vegetable garden, which should provide the necessary vegetables for the household. A well-kept vegetable garden would do much to maintain the health and comfort of all the members of the household. The work should not be left until the last moment, and then only rushed over; but a little spare time would often be found, which could be devoted to the garden.

He mentioned that from a bed 5yds. square, he had cut fully 300 cabbages, some of which weighed up to 20lbs. Gardening was not monotonous work; and if attention was devoted to it it would soon prove to be a pleasure rather than toil. He favored allotting small plots of vegetables or flowers to the children to take care of. This not only helped to improve the homestead, but fostered a liking for this class of work. Samples of vegetables grown in his garden were exhibited and much admired. A long discussion followed, in which the excuses of "no time" were distinctly prominent. Nevertheless, members undertook to devote more time to their gardens in future.

TREE-PLANTING.—Mr. Cooper read a paper on "Tree-planting." This subject, he said, did not receive as much attention as it should. A few acres of suitable land should be allotted to trees on every farm, whether large or small. Not only did trees improve the appearance of the homestead, but they also provided much-needed shade and shelter for the stock. Trees planted to-day would also solve the timber question of the future. The ground for the trees should be fallowed a year before planting, having first been dressed with a heavy coat of stable manure. The soil should be broken right down to the subsoil. He thought the middle of August was the best time for planting in this district, and that plants sent from the nursery in bamboos did better than pot plants if planted properly. A cloudy day should be selected for planting, and the bamboos should be split with a side-cut before placing in the ground, so as not to injure the roots of the trees. It was important that the young trees should receive a regular supply of rainwater until they were able to do without irrigation. In the discussion which followed members differed in opinion as to whether bamboo or pot plants were best for planting, but all agreed that the subject should receive more attention from landholders.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Angaston, July 15.

(Average annual rainfall, 21½in.)

PRESENT.—Messrs. Heggie (chair), Friend, Player, Swann, Giles, Plush, Sibley, Ball, Wishart, Smith, Salter, Matthews (Hon. Sec.), Dr. Cowan, and three visitors.

INTENSE CULTURE.—Mr. S. O. Smith read the following paper, taking as his topic "Can a man make a living on 20 acres of land at £20 per acre":—"Land at this price would be good, so we may consider at once the qualifications in the man which lead to success. Qualifications for success are push, pull, and 'pluck.' He must not have too many 'isms,' particularly '8-hourism' and scepticism, for unless imbued with vigor and hope the best land on earth will not beget him a competency. The prospective agriculturist should make a thorough survey of adjoining properties. Watch results as far as possible as well as methods of his future neighbors. When starting operations any neighbor will give advice, but accept only the advice of the successful man. It is important also, after deciding the possibilities of the land, to follow the suggestions which seem to give the greatest chances of success, involving the least labor and outlay, and the most avenues of disposal of the products. All these things having been decided, the next step to consider is the cost of bringing his land into the paying stage. I will give a few figures, estimated at cost of employed labor. Naturally, if a man's resources are limited he will make a small start and do the greater part of the work with little help from outside. If grape production be the choice, he will need, as in any other branch, to fence and grub trees and stones; and I should advise that a thorough job be made of this work, as it will save a lot of future breakages. Fencing 20 acres, £20; clearing timber and stones, £20; ploughing 9in. deep, 14s. per acre, £14; marking out and holes, £12; vines, 8,000 at 5s. per 100, £20; planting, 8s. per acre, £8; summer cultivation, £2 10s.; hoeing, £1 10s.; total, £97. For fruit trees costs would be enhanced, and would be about £113, as trees would cost £2 10s. per acre as against £1, but cost of planting a little less. During the second year the budding horticulturist could do all the necessary work, but would have to lay out £60 to £70 for equipment of horses and implements; but the greater part of this could be earned by working elsewhere in spare time, preferably in a garden, where he would get experience and hints for his future use. The third year would give him more work and less time to earn ready cash, as he would have a good deal of pruning and possibly

trellising to do. By the fourth year he should be getting 1 ton of grapes per acre at least off his vines, at £4 per ton. Should he be so unfortunate as to be a bachelor his expenses for picking will be considerable, probably 7s. to 8s. per ton. By the time the fruit crop is more than he can handle, the far-seeing man will have raised a family as well as fruit. The fifth year his grape crop should give him $1\frac{1}{2}$ to 2 tons per acre, with a gross return of up to £160. Future years should return up to $2\frac{1}{2}$ to 3 tons per acre, giving £10 to £12 per acre. These figures may appear high, but so is the price of land, £20. Under currants, with present conditions and prices, the fourth year should give $\frac{1}{2}$ ton per acre; but perhaps one-third would be a safer estimate, as both greater and less results have been obtained. But before this stage is reached he must account for £5 per acre for trellis, £100 for trays, £50 for shed, and, say, £25 for drying-house. The crop should return from £15 to £20 per acre; but harvesting expenses would be heavy, probably £5 per ton; so that, adding interest to the rest of his expenses, he has not at this stage a very large margin; but from now on, making due allowance for adversities which sooner or later come to all of us, the grower should be able to make a very comfortable and enjoyable living. I have not touched on the side issues possible to the enterprising man, such as growing small stuffs and vegetables between the young trees or vines, or better still, on a part of his holding reserved for this purpose, the keeping of a cow and some pigs."

Blyth, July 11.

PRESENT.—Messrs. McEwin (chair), Dunstone, Pratt, Coleman, Schulze, Zweck, R. M. and M. S. Longmire, Williams, Lehmann, Pedler, Eime (Hon. Sec.), and two visitors.

ANNUAL MEETING.—The annual report was presented by the Hon. Secretary. This showed that 10 meetings had been held, with an average attendance of 13. One home-stead meeting had been arranged, and the following subjects had been dealt with:—"Fallowing," "Blood and Roadster Horses," "Poultry-keeping," "Hay-cutting and Stack-building," "Clydesdale Horses," "Dry Farming," "Home Gardens," "Care of Harness," and "Care of Farm Machinery."

RAINFALL.—Mr. McEwin read the following short paper dealing with the rainfall:—

"In calling members' attention to rainfall, I want to point to the regularity with which precipitations occur. If we take a 10 years' average we find January the driest month. The average falls are—January, 48 points; February, 53 points; March, 1-29; April, 1-17; May, 2-13; June, 2-69 (our wettest month); July, 1-82; August, 1-81; September, 1-61; October, 1-37; November, 1in.; December, 70 points, or an average rainfall of about 16in. This rainfall varies from $12\frac{1}{2}$ in. in 1901 (the driest year) to $19\frac{1}{2}$ in. in 1910 (the wettest). If we take the last five years we get an average of 16-66in.; the previous five years, 15-79in., being a difference of 87 points. In noting the falls during different months we find June gives a consistent rainfall. During the 10 years the lowest fall was 1-66, in 1907, which was one of our driest years. This year our fall has been 2-60in.—about the average for the 10 years. In making extracts from my 1901 diary, I find that with a $12\frac{1}{2}$ in. rainfall the average yield from my land was 14bush. The experimental plots with no manure yielded 6 $\frac{1}{2}$ bush.; with lowt. Thomas' phosphate, 6 $\frac{1}{2}$ bush.; 75lbs. super phosphate, 11 $\frac{1}{2}$ bush.; lowt. superphosphate, 14bush. In 1902, with a 14in. rainfall, my average was 7bush. This is partly accounted for by the kind of wheat I had sown, namely, Majestic and Gallant, which went off with the hot wind and also germinated very badly. Eighteen points fell in April and 42 points in May; but I had 14bush. from King's Early and 10bush. from Pioneer Purple. This was also a very severe year for hot strong north winds, which affected Majestic and Gallant heads very badly. I find we had seven very severe hot north winds during September, followed by others early in October. Since I have used manure I have found that, with a good germination, a fair crop is assured. September is a critical month with the crops, and much more depends on the temperatures and winds than upon the quantity of rain that falls. Hot north winds on the wheat coming into ear does damage that rain cannot counteract. In 1907, the rainfall was very low, being $12\frac{1}{2}$ in., yet the season was favorable for wheat, and some magnificent crops were reaped. In April, 2-48in. rain fell; and in May, 1in. Solomon knew something about agriculture when he said we depended on the early and latter rain." In discussing the subject, members considered that as the average rainfall of the last 10 years had been little better than that of the previous decade, the improvement in the yield must be attributed to better cultivation. Mr. Dunstone said that while farmers years ago had left the district on account of the prevailing hot winds destroying the crops, of late years he had not had a single crop blighted with the wind. He attributed this to the fact that the cultivation of the country lying to the north had had the effect of tempering the winds.

Clare, July 7.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. L. McKenzie, J. H. Knappstein, Jarman, Radford, Dux, Victorsen, Scott, Pascoe, Nolan, Lloyd, Forbes, Dalry, Pink, Maynard, Pryor, Hill, Radford, A. and F. Lee, Keane, and Knappstein (Hon. Sec.).

FEED FOR STOCK.—The following paper was read by Mr. Pink :—" Every horse or cow owner should grow some greenfeed for his stock. It should be sown in this district directly after the first good rains. March or April is the time to sow barley, Cape being the best variety for early greenfeed. When first cut, say when 18in. or 2ft. high, barley is so sweet that the stock eat it very readily, and it keeps stable-fed horses in good health. I feed a little every night to each horse in addition to their ordinary meal. For summer greenfeed, sorghum and maize do well in this district, as we generally get good summer rains. About September or October is the best time to sow either of these. Should a heavy rain occur after sowing and it sets the ground down hard, harrow or cultivate the field and sow it again. I have seen seed sown three times before the right time was hit, and then the crop paid. I favor putting some of each in. The maize, if cut fairly early, will yield a second crop, which can be fed off afterwards. For feeding horses, if possible, chaff these fodders and mix with the cereal chaff. This practice saves a considerable amount of chaff and keeps working horses healthy during the summer months. Last summer, for 20 horses we used to chaff up about 5cwt. of these fodders every evening and mix with chaff. Hay that makes the best feed is that grown without superphosphates. Before the manures were extensively used horses used to do well on dry chaff alone. Now, since the introduction of manures, some extra grain must be put in with the chaff, otherwise horses will not do well on it. I like the King's Early variety for hay, although it is bearded. When stacking this hay I have seen horses eat all the loose stuff around the stacks. This shows that it is sweet hay. It grows well on these plains, but does not thrive so well in the hills. To feed with chaff I favor bran and oats, the latter to be crushed if any of the horses are at all aged. If it is crushed any length of time before being used it gets stale and is not nearly so good and sweet. Every feeder should have a lump of rock salt in it, especially about here where the water is not at all brackish. Place the water in the yards if the troughs can be kept clean." In the discussion which followed, Mr. Victorsen agreed that it was a good plan to have water laid on in the horse yards. He considered lucerne to be absolutely the best green fodder. Mr. Knappstein said oats were better than wheaten hay for horses.

Freeling, June 7.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. F. H. Heinrich (chair), C. J. H. Mattiske, Shanahan, C. H. Mattiske, jun., H. and C. W. Koch, Leake, Neindorf, and G. A. Block (Hon. Sec.).

HARROWING GROWING CROPS.—Mr. Heinrich thought this an opportune time for farmers to harrow a portion of their crops, as the plants had now fairly rooted. This would break the crust and destroy weeds. Mr. Neindorf said that care was necessary in harrowing crops after they were up. Otherwise they would receive more harm than good. The best time was a day or two before a general rain, if such could be foretold.

SUMMER SCARIFYING STUBBLE GROUND BEFORE FALLOWING.—The Hon. Secretary said he had tried this practice to cover the seeds of the different weeds, and the result had been good clean fallow. Mr. Koch had seen summer scarifying practised on Yorke's Peninsula with good results.

Northfield, July 11.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Williams, Kimber, Roeger, Wright, Mitchell (Hon. Sec.), and one visitor.

AFFORESTATION.—Mr. Kimber read the following paper on the growing of timber trees :—" The planting of timber trees to take the place of those which are being destroyed is very essential to our wellbeing, and schemes for replenishing the forests are engaging the attention of many nations. It is a source of satisfaction that South Australia has established forest reserves, which are doing remarkably well. There is urgent need for more to be done, and there are large areas of Crown lands which, if planted, would undoubtedly prove of great value in the future. Already, from some of the State forests,

many thousands of fruit cases have been cut, giving employment to our own people and showing good financial returns. This can only be done regularly if planting is systematically done. Although planting on a large scale is the duty of the whole State, each individual should aid the good work by planting a few trees annually, but *not* in the same holes. The State has spent much money in establishing nurseries in various parts, from which suitable trees may be obtained gratis, and the energetic Conservator of Forests (Mr. Gill) is always ready to help those who desire to beautify their holdings. Trees are the nesting and resting places of our insectivorous birds. These are becoming scarce and, consequently, insect pests are multiplying. Bees also have to fly greater distances for their honey since the indigenous eucalypts have been destroyed. First of all improve the homestead. Do not plant too close to the house, as falling leaves and twigs are likely to choke gutters. These trees will break the force of the wind and will give shade for domestic animals and poultry. In each corner of the paddock plant, say, half a dozen trees, and out in the paddocks several 'clumps' should be planted. Fence them securely, and when the trees have grown out of reach of stock the fence can be removed. It may be urged that these will make the cultivation of the land difficult, and that the seed sown near the trees will not do well. This may be so; but the benefits to stock far outweigh this disadvantage. Planting may be done on the roadside adjoining your property by permission of the district council. This is usually readily given. These trees add wonderfully to the beauty of the scenery, act as a breakwind, and afford welcome shade to the weary traveller on hot days. If every landowner did this what a different aspect the country would present—and it can be done without much expense. Plant a few trees each year, protecting them by putting in four stakes 6ft. high, with netting fastened so that one side may be opened when trees need hoeing round. Schemes for planting avenues of trees along the roadside should have our practical help. For roadsides, the deciduous trees are best, although evergreens may be put where shadows are not thrown across the metal. I consider evergreen trees—sugar gums and pines of various sorts—to be the best for general purposes. Having decided to plant, apply to the department (send 1d. for postage) and a catalogue will be sent you. In this you will see the number of trees available at the different nurseries and other information useful to the planter. Select the kinds of trees you want and then do not apply for more trees than you can look after well. Before getting them, thoroughly prepare the ground. Where a row is to be planted, deep ploughing is the best and cheapest. If holes are to be dug they should be 3ft. square, with the bottom well loosened and stones removed. If possible, go for the trees yourself and take a supply of boxes and some old bagging for packing; and then, if the weather is suitable, get them in quickly. Frequently trees are destroyed by having their roots exposed to drying winds. If, therefore, you are unable to plant at once, see that the roots are well damped and covered with wet soil. When planting, the roots should be spread out well and any damaged ones cut off. Place the strongest roots in the direction from which the prevailing winds come; fill carefully with loose top soil which should run freely round roots, and avoid putting in clayey subsoil or bits of wood. Press the soil firmly, stake and tie trees that are large enough, and also put in a stake where the smaller trees are—2in. by 2in. jarrah, 5ft. long, makes a good stake and is not costly and lasts a long time. During the first year the young trees require most attention; but they will certainly pay for it. Give water when needful. On no account should the soil be allowed to become baked hard around the stems. After a watering or a heavy fall of rain, loosen the surface soil, as a loose mulch of soil will retard evaporation. I hope that members of this Branch will realise it to be their duty to aid in the matter of tree-planting. If they do so they will be amply rewarded, not only by the improved appearance of their properties, but also by their increased monetary value. Landowners should encourage tenants to plant trees by giving a bonus for every tree planted by them on its becoming two years old. Some plan of this nature should be embodied in every lease, and the outcome would, in a very few years, show the wisdom of it. We should also encourage our children to take an intelligent interest in the School Arbor Day, supporting the teacher in his work of instilling in them a love for the trees, shrubs, and flowers which beautify our glorious country." Discussion was deferred until next meeting.

Saddleworth, July 21.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. Townsend (chair), Cornwell, Frost, T. and J. H. Eckermann, Crawford, Colebach, Graham, Manning, and Coleman (Hon. Sec.).

ANNUAL MEETING.—The Hon. Secretary reported that during the year the following subjects had been dealt with :—"Improvements in Seed Wheat," "Eradication of Noxious Weeds," "Colic, Inflammation of the Bowels, and Worms." Lectures were delivered by the Government Veterinary Surgeon and the Poultry Expert, and a demonstration in poultry dressing was given.

FARM IMPLEMENTS.—Mr. F. Manning read a paper on this subject, in which he traced the improvement of the farm machinery and implements. A great deal of improvement had followed the introduction of artificial manures. The invention of the binder had revolutionised haymaking, and the use of the harvester had become general. Last season at Pinnaroo severe losses were experienced by farmers through heavy rains falling when the greater part of the crops were stripped and were waiting for the winnower. This sort of thing was a convincing argument in favor of the complete harvester. Early fallowing would enable a man to devote more time to cultivation, so to retard the evaporation of moisture. The spring-tooth cultivator was an excellent implement for cultivating fallow. As regards ploughing, the four-furrow was sufficient for a team of eight horses to fallow to a depth of 5in. or 6in. in the local soils. Careful attention should be given to the working parts of the drill, particularly the revolving plates distributing manure. The parts coming in contact with the manure could be taken out, cleaned thoroughly, and coated with two or three applications of enamel paint. The oil engine now played an important part in the farm work. Chaff-cutting, wood-cutting, pumping water, crushing wheat, oats, and barley, and much other similar work could be done with it. All machinery and implements when not in use should be put in gear for action, thus reducing the pressure on the spring coils. Considerable discussion followed the reading of the paper. One member had black-leaded the working parts of his drill with good results. Some members thought the practice of deep ploughing was hardly as much in force now as it was several years ago, but the aim of the farmers was still to work down their fallows well and obtain a good seed bed.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Maitland, July 6.

(Average annual rainfall, 19½in.)

PRESENT.—Messrs. Opie (chair), Bowden, Bentley, Lutz, O'Grady, Tossell, and Pitcher (Hon. Sec.).

QUESTION BOX.—In reply to a question as to whether it was possible to grow crops so that they would follow in succession, week by week, or monthly, so as to avoid rush, Mr. Tossell said it was not possible in this district. Where irrigation could be practised it was possible to grow garden crops in this way. With this view members generally agreed; but Mr. Tossell was of opinion that on the poor subsoil of Yorke's Peninsula it would prove to be impracticable.

FALLOWING STUBBLE LAND WHEN DRY.—A question as to whether it was advisable to fallow stubble land dry, directly after harvest, or leave it till after seeding and fallow wet, was forwarded to the Director of Agriculture, who replied as follows :—"The answer to your query depends much upon the kind of land to be dealt with. There are, of course, certain soils that could not possibly be fallowed in the summer time without the expenditure of very great power, and even then very unsatisfactorily; but there are some kinds of soil that will plough freely enough in the summer time. If, therefore, it be intended that the land is to lie fallow all the winter and following summer, and it ploughs freely in dry weather, it is an advantage, so far as keeping the work of the farm forward is concerned, to have a certain amount of the fallowing done before seed time comes on. There is, for example, land about Sheoak Log which is very sticky and difficult to plough in winter time, and which farmers used to find that they could plough in the summer, and work in the following spring and summer as a fallow, and get results as good as if they had waited till after seed time to begin their fallowing. In fact, results were better

than when they had puddled the land by fallowing it too wet. Wherever dry ploughing is practised the land should be thoroughly worked in the following winter while the moisture is in it. Mallee land, light land, indeed a great deal of the land on the Peninsula, should not be ploughed dry. In my experience it has never given satisfactory results, though of course the working of the land in the following winter, to kill the weeds that may have come up, tends to work it back into the physical state desirable for wheat-growing. I see no objection to ploughing up stubble land in the summer and working it down with a view to putting rape upon it, or a mixture of cereals, to be fed down with sheep; but on a general question of dry ploughing for wheat, the chances favor the man who avoids it."

Minlaton, July 15.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. R. H. McKenzie (chair), Giles, Parsons, Martin, Evans, Correll, Vanstone, McKenzie (Hon. Sec.), and one visitor.

DESTRUCTION OF RABBITS.—Mr. Correll had used carbide for the purpose of destroying rabbits with great success. He used a jam tin, with a little water in it, put a small piece of carbide into the water, and inserted the tin in the burrow, the mouth of the burrow was then closed up.

IMPROVEMENT OF BUREAU MEETINGS.—Mr. Giles read the following paper:—"The different Bureau meetings held throughout the State are to the producer what the State school is to the children—a place to learn. Farming years ago was not thought so much of as it is to-day. Anyone was thought capable of farming, but experience has taught that farming is a work of science. The nature of the soil has to be studied, also the seed which is most suitable for the land. To-day we have our agricultural colleges, where our young men learn the science and practice of agriculture. Men who are settled on our farms have their Bureau meetings, where they learn from each other's experience. I say, without hesitation, that these are a great help to the producer who wishes to learn from the experience of others in his district. It should be the object of every member to make the meetings as interesting as possible. In the first place members should attend every meeting. I admit there are times when they are unavoidably prevented from attending, such as harvest time and seeding, but trifles should not keep members away. Punctuality should be observed. We regret that meetings are so often interrupted by other engagement. Bureau meetings should not be made a secondary matter, but should have our first attention. To make them interesting every member should be willing to give at least one paper in the year. Homestead meetings would be very interesting, especially in the spring, when a tour of inspection could be made of the growing crops in their different stages, the fruit and vegetable garden, and also the live stock. From the fruit garden we might learn lessons on pruning, grafting, and budding, and have a very profitable time. The Branches from Maitland to the southern end of the Peninsula could hold annual conferences, say, one year at Maitland, the next year at Minlaton, and the next at Yorketown, where delegates from each Branch could give papers on suitable subjects. The experts from Adelaide would doubtless give addresses on desired subjects. This would have a tendency to bind us together in our efforts to promote the agricultural interests of the community."

Pine Forest, July 11.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. W. H. Johns (chair), Carman, Goodridge, Schultz, Inkster, Nelson, Hewett, and R. Barr, jun. (Hon. Sec.).

CUTTING CHAFF.—The question of the best length to cut chaff was discussed, and members agreed that the most suitable for general use was the $\frac{3}{4}$ in. gauge.

SCARCITY OF LABOR.—Mr. Hewett stated that owing to the difficulty of obtaining suitable labor at seeding time he had cropped 250 acres less than he wished. Others had been hampered in their work from the same cause, and it was agreed that owing to high wages and the contemplated enforcement of restricted hours thousands of acres would go out of cultivation in this district.

WESTERN DISTRICT.

Elbow Hill, July 8.

PRESENT.—Messrs. Cooper (chair), Tilley, E. A. and S. V. Wake, H. and F. Wheeler, Ward, Freeth, Williams, and G. F. Wake (Hon. Sec.).

AILMENTS IN STOCK.—Mr. Freeth read a short paper dealing with this subject. Farmers could not pay too much attention to their stock, he said, especially when the animals were sick or injured. The chief ailments which affected the horse were influenza, strangles, stomach worm, sand, and botfly. When treating for influenza or strangles the affected beast should be put in a loose-box and steamed over hot bran with a little eucalyptus added. The mixture could be placed in a good wheat bag, held over the nose of the animal so that the fumes were inhaled. A drench should then be given. He did not favor rubbing the neck of animals suffering from strangles with mustard, as it opened the pores and there was a likelihood of a fresh cold being caught. Horses suffering from worms should be given a purgative medicine about half an hour before the morning feed. The symptoms of botfly were a tendency on the part of the beast to nip at its side, and the appearance of red pimples on the inside of the upper lip. He recommended giving the patient 2qts. of new milk and 1 pint of molasses. Fifteen minutes after the above dose had been administered, 2qts. of very warm sage tea. Half an hour later, 3pts. of Currier's oil or Epsom salts. In discussing the paper, Mr. Wake said he always used a little sulphur on a shovel of hot coals for treating strangles. This was placed under the animals' nose so that the fumes were inhaled. It enabled the subject to breathe through its nostrils; if it was unable to do this the case was serious. Mr. Tilley had used tobacco-juice for treating worms with good results. Mr. Cooper had found linseed oil effective. The Hon. Secretary thought colic the most prevalent disease in the district.

LATE v. EARLY LAMBS.—Mr. Wheeler contributed a paper on this subject as follows:—"The only advantage that I can see in early lambs is that they are always bigger than late lambs at the time they are sold as freezers; and as the fat lamb industry in this district has proved a failure, we are working at a loss by breeding early lambs. As sheep are only kept on a small scale here, and the only return we get is the wool, besides our own supply of meat, I think we would do better to have the lambs dropped about July. Feed generally seems to grow very well after that time, and the ewes could look after the lambs well, and the growth of wool would not be hindered, as is generally the case when the lambs are dropped before the winter. Unless a ewe is in very good feed for the first three months after lambing she is sure to fall away, and a sheep losing condition is not growing wool. If the wool was allowed to grow right on until the coldest of the winter was over, it would cut a better fleece, and as there would also be better feed to raise the lambs on, the late lamb's fleece would not be so large as that of the early lamb, yet the extra wool the ewe would produce would more than make up the difference." In discussing the matter, the Hon. Secretary supported the breeding of early lambs, as they always cut a good fleece. The trouble of lack of feed could be overcome by systematic subdivision of paddocks.

Green Patch, July 17.

(Average annual rainfall, 26in.).

PRESENT.—Messrs. Gore (chair), Smith, R. J., P., and G. Sinclair, Chapman, Merchant, Parker, and Whillas (Hon. Sec.).

PRUNING.—The meeting was held at the homestead of Mr. McFarlane. Mr. W. Smith gave an exhibition of pruning of fruit trees, and also read the following paper on the subject:—"The apple and pear.—When these trees are being pruned for the first year they should be cut back to about 18in. to 2ft. in height. The limbs should be started from the stem of the tree at different points if possible, thus giving each branch a firm hold of the trunk and laying a good foundation for the tree in the future. Keep them well open in the centre to admit plenty of sunlight, which plays such an important part in the maturing of both wood and fruit. The head of the tree should be properly thinned out, and for the first few years the whole aim should be to grow a strong healthy tree, with a well-shaped head. Once the tree has been properly formed and has commenced to bear regular crops, very little pruning is required beyond clearing out of dead and worthless wood and the removal of such shoots or branches as become outplacced by branches better situated, and which neither crowd nor tend to put the tree out of balance. Some trees naturally assume a good shape, while others spread out very wide. Others again make a very close upright growth. In the case of spreading trees always prune

to an inside bud, an upright tree to an outside bud. Some kinds of apple trees will produce fruit buds abundantly, while other varieties do not develop many until they attain a good age. Usually systematic winter and summer pruning will hasten their development. When these spurs bear fruit and extend in length it will be found necessary to remove some and to keep the remainder shortened back and thinned out. The shape mostly adopted is that of the goblet. About six to nine arms are sufficient on either of these kinds of trees; if any more were left they would probably cause inconvenience in pruning, spraying, and fruit-picking. The apple and pear only crop on wood two years old and over. Peaches and apricots.—These two kinds of trees may be formed on the same principles as the former. They need to be kept well back for the first few years. Do not at any time leave spurs longer than, say, 15in., otherwise the lower portions become bare of fruit buds or spurs. This cannot be remedied without severe cutting back of the main arms to throw out young growth, which means a couple of years without very much fruit. The apricot and peach bear their fruit on one year old wood and spurs two years old or over. It is not always the fancy system of pruning that is the secret of fruitfulness. This is brought about by watching closely the requirements of the tree in the particular place where it is growing." A profitable discussion followed the reading of the paper. In reply to a question as to how a young apple tree that had been call-pruned two years back, and had since shown little growth, should be treated, Mr. Smith advised that the tree should be well dug round and manured. Should this fail, the tree should be replaced. With regard to the treatment of young trees which had been barked by rabbits, Mr. Merchant said plastering the bark with moist clay, then binding tight with bagging to keep the air out, should prove an effective remedy.

FRUIT-DRYING HOUSE.—Mr. Whillas read the following paper on this subject:—
 "A well-constructed artificial currant or fruit drying house provides—first, economy of labor, both for handling the fruit and for running the plant; second, quick and even drying, with safety against overdrying; third, fuel economy. Only experience can give the best type and design; but a shed constructed on the following lines will give better results than some of the crude drying-houses that are being used. In many of these no provision is made for moving the moist hot air away from the fruit. What is required is a dry hot draught of gases through the fruit of even temperature, and of such composition that the fruit will not be injured in any way. If wood is used as fuel it is necessary that the furnace gases should not come in contact with the fruit, although by using charcoal this is not detrimental. For the former a very complicated arrangement of flues would be necessary, and at its best it would give a poorer fuel economy than when the furnace gases pass through the fruit trays. It is more economical to use charcoal with a more simple flue system and pass all the gases from the furnace through the house. Dry and well-seasoned wood could be used for preheating the house before charging with fruit. When once raised to the required temperature it will not require such a quantity of charcoal to keep up the heat. *Specification of a Drying-house.*—The main body of house to average about 2ft. below and 6ft. above ground level. Walls 2ft. thickness throughout of rammed damp earth (using boards). Inside dimensions 26ft. by 8ft. by 8ft. height above floor line, back end walled across, front open. Roof of bush timber set close, of 10ft. length, then earthed over to 2ft. thickness at centre. The open end fitted with a 9ft. by 9ft. ledge door of 6in. by 1in. flooring. This door to be wedged to place and faces luted with clay to make airtight. This main door fitted with a manhole and door of 24in. by 14in. in clear on right hand side 9in. off edge. Truck line of 10lb. per yard rails, 4ft. gauge, sleepers at 18in. centres, 6ft. by 6in. round timber adzed to take rails. This truck line runs through house at floor level and to be carried back at least 34ft. outside to give room for loading a fresh charge and unloading to drying floor. If fruit is to be part sun-dried the line should be taken back through the centre of the drying floor, so that trays can be loaded direct on to trucks. In this case the line should be arranged if possible with a down grade towards the plant. The truck line and flues to be 6in. off centre line of house, thus throwing the trays 6in. off one wall and 18in. off other, giving passage way opposite manhole. At least 16 trucks will be required for convenient handling, but as wheeled trucks are expensive, low sledges having steel plate runners fitting loosely over rails could be used and rails kept well greased. Each truck to take one tier of ordinary 6ft. by 3ft. drying trays, there being about 26 trays on each, and eight tiers to make a full charge. Furnace grate to be 4ft. by 18in., cast-iron firebars with $\frac{1}{2}$ in. openings; mouth of furnace comes flush with back wall of house and 3ft. below floor line; ash pit 12in. below this, and thence excavated back 15ft. by 6ft. wide to give room for firing and cleaning flues. Furnace of firebrick, joints clay; inside dimensions 18in. wide by 18in. height at arch and 5in. spring in arch. This carried back 8ft. from mouth, that is 4ft. beyond firebars. Furnace to be fitted with a cast-iron door; clamping

made of $\frac{1}{2}$ in. plate, to be used as ash pit. Running under house at 3ft. below floor line the furnace contracts to flue of 12in. width by 14in. height; sides earth, and covered with stone or brick. This flue at front end of house rises through a 14in. opening to return flue immediately above it of 4ft. width by 18in. height, the cover of this flue coming 6in. below floor line. An iron plate damper to be fitted to bottom of flue just before it opens to upper flue; damper operated by chain carried through main door. The return flue runs full length of house; sides are of earth, and is covered with 5ft. sheets running across the flue of 22 gauge corrugated galvanized iron, these sheets being double-lapped and well riveted. These sheets to be punched with $\frac{1}{4}$ in. diameter holes at 12in. centres each way. These sheets not to be fixed at ends but let into ground, giving room for expansion, and ends covered with loose sand to make fairly airtight. A flue of similar construction to be fitted at ceiling of house 6in. below roof, the iron being 8ft. length sheets in this case, and punched as before. These sheets rest on 3in. by 3in. oregon spiked to walls, and sand used as before to make fairly airtight. This top flue to be connected with stack at back end of house; stack of 20ft. above roof by 14in. diameter of 20 gauge black iron, well riveted to base plate of 4ft. by 4ft. by $\frac{1}{2}$ in., resting on roof timbers, then well earthed over. Stack stayed with three guy ropes of No. 8 wire."

Koppio, July 6.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. G. B. Gardner (chair), M. Gardner, Brennand, G. and M. Howard, Jericho, Thompson, F. and R. Richardson (Hon. Sec.), and three visitors.

VETERINARY SURGEON.—Members were of opinion that the isolation of the West Coast and the value of live stock warranted the stationing of a veterinary surgeon in the district.

Miltalie, July 8.

(Average annual rainfall, 14 $\frac{1}{2}$ in.)

PRESENT.—Messrs. Story (chair), G. W., S. W., and E. Story, F. and J. S. Jacobs, Laffin, Wilson, Brooks, W. G. and E. P. Smith, A. R. S. and J. H. L. Ramsey, Kobelt, Hier (Hon. Sec.), and three visitors.

PROBLEMS OF THE MALLEE COUNTRY.—Considerable discussion took place on this subject, which was dealt with by Mr. Kobelt in a paper read at the last meeting and printed in the July issue. Members agreed that the rabbit pest was the most serious problem that confronted them

Mitchell, July 8.

PRESENT.—Messrs. Green (chair), J. Green, Niss, Hregery, Sampson, Dorward, and Miller (Hon. Sec.).

FALLOWING.—This subject was introduced for discussion by Mr. Niss. In this district, he said, it was wise to fallow as much land as possible. A good plot of fallow greatly facilitated seeding operations, as the work could be proceeded with speedily on all suitable days. He would plough to a depth of about 5in., and would use a Smith three-furrow implement with a team of six horses and plenty of draught on, to pull out the stumps. He had not found early fallow very successful, as the soil set down too hard in this district if fallowed very early. Mr. Dorward had also found the soil liable to bake, and therefore advocated fallowing early, so that the desired area could be done before it became too hard later in the year.

DESTRUCTION OF MALLEE SHOOT.—Mr. Sampson reported successful work in the destruction of shoots by means of the fire rake on stubble land before fallowing.

CAPITAL REQUIRED FOR FARMING.—The Hon. Secretary was of opinion that a sum of £850 was needed to commence farming in such a district as this. That sum would provide a full set of implements, labour, living expenses, wire netting, and seed and super, for 200 acres. Most of those present thought the estimate was too low,

Penong, July 8.

(Average annual rainfall, 12½ in.).

PRESENT.—Messrs. J. M. Edwards (chair), Priden, Miller, Grad, Wald, King, Suggants, Shipard, Oats (Hon. Sec.), and two visitors.

RABBIT-PROOF FENCE.—In reply to a question as to the best method of erecting a rabbit-proof fence Mr. Miller said that posts should be placed not more than 15 ft. apart. The netting should be 42 in. wide and should be 3 ft. above the ground. It should be laid in a trench 3 in. deep with the bottom 3 in. turned outward. This would prevent the rabbits from burrowing under. Only 18 gauge netting should be used. Mr. Kalman thought it advisable to tar the bottom of the wire netting before burying it. Timber or branches of trees could with advantage be laid on the portion of netting to be buried before it was covered with soil. The Chairman was also of this opinion, but thought the posts should not be more than 10 ft. to 12 ft. apart.

DEPTH TO FALLOW.—The question of the best depth to fallow was discussed. The Chairman said 3 in. was sufficient, but Mr. Miller considered that some of the local soil should be fallowed 4 in. deep. The Hon. Secretary favored 4 in., but sometimes better results were obtained from 2 in. to 3 in. ploughing.

CONCRETE.—Questioned as to the best proportions of lime, sand, and stone to use in concrete, the Hon. Secretary said there should be about equal quantities of lime and sand and as much broken stone as could be well mixed into it. Mr. Miller used two parts of lime to three of rubble for concreting. The Chairman preferred half lime in concreting and plenty of stone in it. He would put a little more cement than sand for the last coat when cementing.

IMPROVING BUREAU WORK AND MEETINGS.—Suggestions for increasing the value of and interest in meetings were called for. Homestead meetings were very useful, and if every member took part in the discussions good work would be done. The Hon. Secretary said the main point was for members to attend regularly.

Petina, July 1.

(Average annual rainfall, 12½ in.).

PRESENT.—Messrs. Penna (chair), Keeley, Kenny, Newbon, Bascombe, Doley, Howard, Roberts, and Souter (Hon. Sec.).

VETERINARY EXAMINATION OF STALLIONS.—A paper on this subject was read by Mr. Howard. The writer said that while there was no doubt that the existing regulations under which stallions were granted certificates of soundness would improve the soundness of the horses in this State, these regulations hampered breeding, and what the farmers in new districts needed was plenty of cheap horsepower. He also foreshadowed the passing of legislation which would compel owners of unsound stallions to castrate them. Such a law would result in horses being altogether too dear for settlers to afford. Mr. Doley through stallions should only be refused certificates on the judgment of three veterinarians.

Shannon, July 11.

PRESENT.—Messrs. Proctor (chair), Glover, Wilkins, Bartley, W. and J. Smith, Carey, M. A. and T. Cronin, Irons, and J. J. Cronin (Hon. Sec.).

ANNUAL MEETING.—The report presented by the Hon. Secretary showed that nine meetings had been held, with an average attendance of 12 members. Papers had been read on the following subjects:—"Working at Seasonable Times," "Water Conservation," "Fallowing," "Care of Harness," "Laying Out the Farm," and "Stock-raising on the Farm."

STOCK-RAISING ON THE FARM.—This subject was dealt with in the following paper by Mr. Wilkins:—"Every farmer should breed his own horses where it is possible to do so. Horseflesh is very expensive, and the man who can sell a good draught colt is as well off as the one who has a hundred bags of wheat to sell at the present price. As soon as our scrub lands become more developed it will become an easy matter to raise a few foals each year. Try to have a colt to break in every year to keep up the strength of the team. Horses that are bred on the farm are generally better than those bred on a station. They are more docile, and generally turn out better workers. Select the best stallion in the district. If the sire is a good-tempered animal and the dam is a good, kindly worker the progeny will generally be good. The Suffolk Punch are better for farm work than

the heavy draught, because they are more active, and they are hardy. I consider this breed the best plough horse: being clean legged they do not tire so quickly on heavy land. They are strongly built, with good bone. For wagon work I am in favor of the Clydesdale, because they carry more weight and are capable of drawing heavier loads with greater ease than the lighter breeds. The best spring-dray horse is a cross between the blood and draught. By mating a blood horse to an active draught mare one may breed a good useful horse to work anywhere on the farm. Care should be taken to provide enough hay for the horses. Hay should all be chaffed, as it will then go further and there is less waste. Every farmer should also keep three or four cows. Milk and butter are a great help in the household. I would not advocate keeping many head of young cattle, because they are slow in growing, and are rough on the fences. I prefer the Shorthorn to any other breed. They are the best all-round cattle for the farmer. Have two cows in milk at a time, so that milk and butter may be available all the year through. A separator should be used to get all the cream and butter possible. A good cow should average 7lbs. of butter per week. Cows will do very well on cocky chaff, with molasses and bran, through the summer months. A small silo should be used to make a little ensilage; this will help the cows through the summer months, and is a preventive of "dry bble." I think every farmer should try to keep 50 sheep, or as many more as he can. They will pay if only kept for mutton. The Shropshire is the most suitable when kept solely for mutton. This breed is hardy and can make a good living on our scrub lands. It will be necessary to sheep-proof fence 200 acres to keep them in until the whole farm can be made sheep-proof and subdivided into smaller paddocks. Sheep will keep fallow land free from such weeds as drake and thistles. Do not overstock; it is better to keep a few and keep them well. Pigs can be kept at a profit if managed systematically. They can be kept very cheaply on the farm. Twenty acres of Cape barley should be sown each year. This, together with a little crushed and boiled wheat, will maintain 20 or 30 pigs. Bind the barley and stack it in the piggery on a platform about 4ft. from the ground. This will make a good shelter for the pigs, as they need to be kept warm and dry in the cold weather. A few sheaves can be fed to them daily from the stack without much trouble. I prefer the Berkshire to any other breed for bacon. They are the best pigs to keep in condition. Farmers should cure enough bacon for their own use. Money can be made out of bacon on Eyre's Peninsula. Pigs weighing from 120lbs. to 140lbs. are a handy size for killing. Poultry should always be kept in good numbers to keep up a supply of eggs for the farmer's own use. There is always a good demand for any surplus. Fowls can make a good living in the farmyard. There is nothing goes to waste if the fowls are allowed to run loose. White Leghorns are the best layers. Silver Wyandottes are a good all-round fowl for laying and for the table. Turkeys are profitable to rear; they do well in this district and can make a good living out in the field. They are very fond of insect life. At six months old the young birds are fit for the table, and are worth 5s. or 6s. per head. Turkeys need very little feed besides that which they can pick up. The Bronzewing is about the best breed, because it is the largest and heaviest bird for the table. If all these side lines were looked after I am sure there would be a good margin of profit in them for the producer." In the discussion which followed, Mr. Glover stated that farm-bred horses were preferable to any others. Mr. Irons preferred light horses for farm work. Hon. Secretary liked the pure-bred Clydesdale for any kind of work.

Utera Plains, July 8.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Ramsey (chair), R. H. T. and H. Hornhardt, A. and G. Barber, Hill, J. and M. Abrook, Gale, Lee, Chase, Stephens, Guidera, Bilney, West, Berranmack, Naughton (Hon. Sec.) and six visitors.

RABBIT DESTRUCTION.—Mr. J. Abrook read a paper on the subject of destruction of rabbits. He believed that the only way to cope with the trouble was by fencing with wire netting and destroying systematically the rabbits inside the fence by means of traps, poison, fumigation, &c. The 36in. by 1½in. wire netting was not suitable for fencing, as the rabbits could get over, and even half-grown ones could get through. Men should be put on by the councils to destroy burrows and rabbits where the owners neglected to do it, and the cost should be recovered from the landholders. In discussing the paper the Chairman spoke of the effectiveness of bisulphide of carbon. Mr. R. Hornhardt thought 3ft. 6in. netting with a 1in. mesh was the most satisfactory for rabbit-proof fencing. Mr. West spoke of the folly of allowing large number of rabbits to flourish and eat the feed in paddocks which otherwise would carry much larger numbers of stock.

Yadnarie, July 8.

PRESENT.—**MESSRS.** Schubert (chair), J. A. and E. Kruger, Stubing, Jericho, Dreckow, Spriggs, Parbes, and Deor (Hon. Sec.).

PROCURING AND PROTECTING FARM IMPLEMENTS.—A paper on this subject was read by the Hon. Secretary to the following effect:—"The success of a farmer depends largely upon his wisdom in selecting and his care in protecting his implements. In my opinion a farmer must use his own judgment to decide which implement he requires. He should select implements from what is seen of them and not too much from hearsay. An implement that is successful for one class of land is not always successful for another. An implement that is good on fairly clear land will not always work successfully where the stumps are prominent, or sometimes even where it is hilly. Farmers should avail themselves of the opportunity of getting an insight into machinery at the agricultural shows and field trials. An unsuitable implement is not only waste of capital, but often the cause of a considerable waste of time. For the protection of implements it is essential to keep them under cover, as the different conditions of weather have a very bad effect upon them. If implements constructed of steel are left out in all kinds of weather the paint will soon crumble off and allow the iron or steel to rust. The nuts will not only become set on the bolts, but the threads will rust and be rendered weak. When you have finished working a machine for the season all the old grease which has been allowed to accumulate should be removed while it is soft. Note should be taken of any necessary repairs. All implements constructed of wood when being put away in the shed should have a good coat of boiled linseed oil rubbed into them. This will not only preserve all the wood, but will make it much easier to paint. This can be done in a very short time, and it is surprising what a little oil it will take. When you are taking your machine out again give it a good coat of paint. This will keep the weather from having any bad effects while the machine is in use. This is especially necessary with harvesters. They are constructed with a good deal of light wood, and unless they are kept oiled and painted frequently the dampness will cause the wood to swell and warp. Do not buy paint ready mixed in 2-lb. tins, as this will prove too expensive; buy the white lead in 56-lb. drums and the oil in 5-gall. drums; get the colors and mix the paints yourself. This will be much cheaper, and in my opinion a better paint. To preserve the oil keep it airtight. The white lead will keep any length of time if it has about 2 in. of water on it."

EASTERN DISTRICT.**(EAST OF MOUNT LOFTY RANGES.)****Parrakie, July 1.**

PRESENT.—**MESSRS.** F. J. Dayman (chair), Diener, Beelitz, Schmidt, O. and C. Heinzel Brinkley, Lee, Randall, Gravestocks, Threadgold, A. Dayman, Hall (Hon. Sec.), and three visitors.

FALLOWING.—Some discussion took place concerning the best time and depth to fallow. Mr. Beelitz had had best results from early fallow. He would plough 4 in. deep in June or July and cultivate the fallow in spring, harrowing it down to a fine tilth and keeping it loose to retard evaporation. Mr. Brinkley had found that early fallow gave best results. When left till late the soil would set down hard, would be stiffer to work; it was then more difficult to get the desired tilth. He would plough to a depth of 3 in., and the land should be cultivated in September. Mr. Schmidt also favored early fallowing. He would plough to a depth of 4 in. and keep the land well worked; otherwise some patches would set down very hard. The Chairman considered that the nature of the soil should determine the depth to which it should be ploughed. Sandy soils should not be ploughed so deeply. Bay of Biscay land could be turned up 6 in. deep, and worked over three times before harvest. He would fallow as early as possible, and keep the land well worked. Several other members agreed that the Chairman's views were right.

Wilkawatt, July 8.

PRESENT.—Messrs. W. J. Bowman (chair), D. F. and L. Bowman, J. and G. Altus, A. and J. Ivett, Sorrell, Brooker, Tylor, Arhns, Hayes, McAvancy, Harvey (Hon. Sec.), and six visitors.

HOMESTEAD BLOCKS FOR FARM LABORERS.—The following resolution was passed:—"That, in the opinion of members, the Government should, when opening up new country, survey blocks of fair quality up to about 100 acres in extent at intervals among the farm blocks so as to encourage farm laborers to take up land and settle in the midst of the farming community." Farm laborers under these conditions could afford to work for less wages than at present; they would not need to spend their earnings in rail fares to and from the city, nor would they need to keep homes there nor pay exorbitant rents. They would get more regular employment, as when they had finished with one farmer others would be wanting their services.

WINDBREAKS AND VERMIN.—Members considered the windbreaks in this district were too wide. They harbored vermin, and it was thought that farmers should be allowed to roll and burn the breaks one chain wide in front of their blocks. The remaining chain would be plenty wide enough for the purpose. Failing this the Government should destroy the rabbits.

ARABIAN AND PERCHERON HORSES.—Mr. Harvey read a paper dealing with these two breeds of horses. For speed over long distances, he said, the Arabian horses were unequalled in all the world. Every distinguishing characteristic of beauty, endurance, and speed in Europe was due to the infusion of Arab blood. Percheron horses were divided into two classes—the Norman Percheron, a heavy, closely-built animal; and the Percheron, a lighter, cleaner built, and more active animal. The paper then continued:—"These horses are a fixed race, capable of reproducing itself perfectly without deterioration through generations, when pure sires are bred to pure dams. Bred to inferior mares the stallion marks his impress wonderfully on the progeny, and the pure mares also transmit their characteristics in the same wonderful manner. When the Percheron is bred to large rooomy mares the progeny will possess great size. If this progeny is again bred to a pure sire the result is a three-quarter bred horse that is little inferior to the Percheron in all that constitutes power and capability for work. The Percheron is not a fast horse, yet he is capable of making long journeys at a speed equal to that of horses of more pretensions to speed. Percherons would improve the medium and heavy draught horses in Australia. They are ideal farm horses of very powerful build, active, great workers, and very handsome. Mr. Lecky (Davenport) moved at the last Congress that we recommend the Government to introduce Percheron horses into this State. The motion was lost. I hope Mr. Lecky will again move in that direction at the next Congress. Since then the Queensland Government has imported Percherons into that State, and they are greatly admired. I think the Government should do all in its power to improve the breed of horses in South Australia by importing fresh blood for that purpose." Members were agreed that it would be a good thing for the Government to import some Percheron horses into South Australia.

SOUTH AND HILLS DISTRICT.**Cherry Gardens, July 11.**

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. S. Chapman (chair), Jacobs, Lewis, Mildwater, Hicks, A. and E. Broadbent, Lewis, Ricks, Jacobs, Curnow (Hon. Sec.), and two visitors.

ROOT-BORERS.—This subject was dealt with in the following paper by the Hon. Secretary:—"The weevil that works so much destruction amongst the apple, cherry, and other fruit trees by tunnelling holes in the roots is one of the largest of the family *Curculionidae*. In color the mature beetle is dull-brown, with pinkish underparts, and has six rows of spines along the elytra. The female is larger and more rounded than the male. Their natural food is the acacia family. When large tracts of land are cleared of all scrub for orchard planting the beetles are left without food, and it is only natural

that when other trees are planted they should attack the variety most suited to their taste and requirements. The adult beetles are found on the leaves and branches of the trees during the summer months and are easily found in the daytime, and in pairs. A good blow on the stem of the tree will cause them to drop to the ground. Practically the whole life of the adult beetle is spent on the leaves of the trees that are attacked and from which it obtains sustenance. The fertilised eggs are deposited upon the foliage by the female. As soon as hatched the larva descends to the ground and eats its way into the roots. When a tree is badly attacked the flow of sap is arrested, and odd branches are first noticed to be suffering from die-back. If immediate steps are not taken to check the ravages of the pest, serious consequences will result, and the tree will eventually die. Some hundreds of trees have been lost in this way in the Upper Sturt. Specimens of adult beetles taken in the latter district have been identified by Mr. R. H. Griffith, of Adelaide, as *Leptops interioris*. The elytra are soldered together, so that the beetle is unable to fly. It crawls up the stem of the tree and relies on its dull color and habit of dropping to the ground for self-preservation. Various remedies are recommended for the destruction of this pest. For subterranean attack, French, the Victorian Entomologist, favors the following method:—Make, say, half a dozen holes with a crowbar, 1 ft. deep and about 3 ft. from the stem of the tree; fill into these holes about half a wineglass of bi-sulphide of carbon; immediately plug the holes airtight. The fumes will permeate the whole of the surrounding soil, and will kill both the eggs and larva of the pest. As the bi-sulphide is injurious to the feeding roots, this remedy should only be applied during the autumn and early spring. In the early spring and also in the summer months give the trees a spraying with arsenite of lead mixture. This spraying is for the purpose of destroying the adult beetle when feeding on the leaves. Another precaution is to put a collar of zinc or tin around the stem of the tree to prevent the beetles from crawling up."

Clarendon, June 12.

(Average annual rainfall, 33½ in.)

PRESENT.—Messrs C. Matthews (chair), J. L. and C. C. Spencer, A., H. C., E. H., and A. A. Harper, J. Wright, ser., J. Wright, jun., Piggott, White, Jackson, Masters, all Phelps (Hon. Sec.).

ANNUAL REPORT.—The Secretary presented his annual report, which showed that during the year 12 meetings had been held, with an average attendance of 12. The following subjects had been dealt with:—"Sheep-breeding," "Fallowing," "Fruit-growing," and miscellaneous matters. Numerous discussions had been of considerable benefit to members.

Dingabledinga, July 20.

PRESENT.—Messrs. H. Allen (chair), Felix, DeCaux, F. Gill, F. DeCaux, O. Chenoweth, (Hon. Sec.), and one visitor.

TASMANIAN ORCHARDS.—Mr. F. Gill gave an outline on the impressions he received during his visit to Tasmania. He had spent most of his time along the Huon, where the rainfall was about 30 in. The cost of clearing the land there varied from £10 to £25 per acre. The appearance of the soil was similar to that of the Mount Lofty ranges, in places sandy, overlying a good clay subsoil. It was the general opinion that where stringybark would grow apples could be grown. The trees were planted at an average distance of 12 ft. to 15 ft. apart. The average yield was 500 cases per acre, but he had seen one acre of Cleopatras which had produced 1,000 cases. The orchardists ploughed twice in the year, in the autumn and again in spring. Ploughing was followed with cultivating three or four times. The work was done with a single plough and one draught horse. Woolly aphid and apple scale were the chief diseases affecting the orchards. The fact that codlin moth was not very bad was attributed by Mr. Gill to the damp, cool summer. The orchards generally were not troubled with bitter pit. When picking the fruit the growers used a bucket that would go inside an export case. When full, this was put inside the case and the bottom then collapsed, the apples were thus emptied with very little bruising. A sleigh was used for carting the fruit to the shed, about eight or ten cases being brought in at once. These were put through a grader, which graded into six classes. A good packer would pack 100 cases per day. The cases were manufactured from locally grown timber, swamp gum being used for the ends and stringybark for the sides; these were put together at a cost of about 6d. per case. The varieties chiefly in favor were New York

Pippin, Sturmer, Scarlet Nonpareil, and French Crab. Some of the later plantings had a large number of Cox's Orange Pippin. Apples were mostly worked on seedling stocks. Some Rome Beauties were noticed on the island which were failures, whereas this variety did well on the mainland.

Forest Range, July 6.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. Vickers (chair), J. F., E. A., and H. Green, McLaren, Sass, Waters, Pollard, Schultz, Rowley, Smith, and Menks (Hon. Sec.).

BITTER PIT IN APPLES.—Mr. George Quinn read an article by Dr. J. White on the supposed cause of bitter pit, and considerable discussion followed. Several members had seen apples affected with this disease before poisonous sprays were used as insecticides and fungicides, and therefore could not attribute the trouble to this practice.

Gumeracha, July 3.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Porter (chair), Hanna, Kitto, Hittmann, B., A. W., H. V., P. A. E. Cornish, J. B. and W. B. Randall, Monfries, Norsworthy, Jamieson, and Lee (Hon. Sec.).

SHEEP v. COWS.—The evening took the form of a debate between the members of the literary society and the Bureau as to the respective merits of sheep and cows. Messrs. Monfries and Hannaford spoke in favor of dairying, and Messrs. Hanna and A. W. Cornish spoke on behalf of keeping sheep. The judges decided for the former. For years dairying was carried on with success, but with high wages some of the farmers had turned their attention to sheep, as high prices were obtainable for lambs and wool. It was pointed out that the average farm in the district would carry one cow to six acres. After expenses were paid the average return per head should be about £4. By growing fodder most farms would carry one ewe to the acre. The ewe would cut 7s. worth of wool and would rear a lamb to store condition. The lamb would grow 2s. worth of wool and would be worth 7s. after shearing. Members agreed that the nature of the land determined which industry was the most profitable, but both required experienced men to work to the best advantage.

Hartley, July 3.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), O. Wundersitz, Clark, W. and C. Brook, Tydeman, Pratt, Symonds, Phillips, Hudd, Birmingham (Hon. Sec.), and two visitors.

FARM GATES.—This subject was discussed, and members concurred in the opinion that the most suitable gate for the farm was that made from 3in. by 1in. or 4in. by 1in. stringybark, with five bars. It should not be less than 10ft. or 12ft. wide, in order that the drill and harvester might pass through readily. The entrances that were used very much should have double gates, each 7ft. wide. When a small vehicle had to be taken through it would only entail the opening of one gate. Members thought wide gates would sag unless properly stayed.

Kanmantoo, June 10.

(Annual average rainfall, 17in.)

PRESENT.—Messrs. J. Downing (chair), Hay, Talbot, H. and E. Shepherd, W. and L. Wooley, Pym, A. Mills, R. Downing, W. Mills (Hon. Sec.), and four visitors.

MORTALITY AMONG LAMBS.—A discussion took place regarding the death of numbers of lambs in the district. Ewe, wether, and ram lambs, of ages ranging between seven weeks and four months, became stiff and died. One member had opened and examined one of them. The inside appeared to be inflamed, and there were yellow streaks on the caul fat. The trouble could not be attributed to tailing, as lambs which had not been tailed had been affected as well as those tailed by knife or iron. Members came to the conclusion that the disease was due to eating some plant, and decided to send a carcass for veterinary inspection.

Meadows, July 11.

(Average annual rainfall, 34½ in.)

PRESENT.—Messrs. S. Smith (chair), Brooks, Morris, W. J. and G. R. Stone, Nottage, Kleeman, and Bertram (Hon. Sec.).

DRYING AND CANNING FRUIT AND VEGETABLES.—A paper, dealing with this subject, was contributed by Mr. Griggs. He advocated the drying and preserving of fruit to dispose of surplus produce which otherwise would be unmarketable, and would keep the market down. Drying by evaporation was preferable to sun-drying, as it was much quicker. The risk of loss of fruit through inclement weather was obviated. The May number of the *Fruit World* contained a practical article on the subject, the context of which Mr. Griggs embodied in his paper.

Meningie, July 10.

(Average annual rainfall, 19 in.)

PRESENT.—Messrs. Scott (chair), Taylor, Hiscock, Martin, Mincham, Hill, Sabey, Coad, Tregilgas (Hon. Sec.), and two visitors.

ANNUAL MEETING.—The annual report was presented by the Hon. Secretary, and showed that 11 meetings had been held, with an average attendance of nine members. Four papers had been contributed, and various subjects of interest had been discussed. The Hon. Secretary urged members to put more life into the work of the Branch by attending regularly and being prepared to help. He pointed out the value of this institution to producers in any district where established.

Morphett Vale, July 13.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. Spriggs (chair), Anderson, Rosenberg, O'Sullivan, J. H. and E. Perry, S. F. and S. R. Christie, and Hunt (Hon. Sec.).

MIXED FARMING.—Mr. J. H. Perry read the following paper on this subject:—"A farm of 300 acres, one-third of which could be cropped each year, is the most suitable for mixed farming. Of the 100 acres to be sown I would sow for hay 60 acres of Algerian oats and White Tuscan wheat mixed in the proportion of 1 bush. of the former to 2 bush. of the latter; also 20 acres of peas, and the remaining 20 acres I would sow with barley. By using stable manure on barley ground a better crop is ensured. Of course this does not prevent super. being used. If you strip the barley it is a very profitable proceeding to bind the straw as soon as possible and stack it before the sap has dried out of it. This makes good feed for any loose stock, and if a post and rail fence is put up around the stack, not too high for the stock to reach, it prevents waste. Where it can be avoided I would not sow barley on the same ground more often than once every eight or 10 years. Before the first rains it is advisable to run the cultivator over the barley ground; the result will be good feed for lambs. Pea straw can be stacked and surrounded by fence in the same manner as barley straw, and it can be used for winter fodder. In the preparation of land for cropping I would fallow the 60 acres for hay in July if possible. With care it should be possible to keep about 100 ewes besides a few wethers, or any other lines you can secure at a price that will return a fair profit. I would keep about eight or 10 cows. Remember it takes as much to keep a poor cow as for a good one. Two or three should come in about the middle of February and the rest every three weeks or so following. If a cow is milked for about nine months and then let dry off the three months spell will prove beneficial. Maize, sorghum, mangolds, and suchlike food are most suitable for cows. The keeping of cows naturally suggests the keeping of pigs. I would keep six breeding sows. It is now necessary to fence with pig netting four or five three-acre paddocks for the pigs to run in. I would sow some of the paddocks with barley and mangolds, or perhaps rape. Piemelons might also be grown after one crop of early barley has been eaten off by pigs, as they make excellent pig feed. With regard to poultry, a better percentage of profit can be obtained by keeping 150 than 300 head, feed them as you will. Horses, of course, are a necessity with every farmer, and he should keep two or three mares to breed from. Sell off old stock as soon as there are enough young horses to take their places." In reply to a question regarding the best crops to use in rotation with wheat, Mr. Perry said wheat should follow peas wherever possible.

Mount Pleasant, July 14.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. H. H. Giles (chair), Phillis, Thompson, Miller, Langford, Tapscott, Mainland, Fulwood, Maxwell (Hon. Sec.), and one visitor.

HORSE-BREEDING SOCIETIES.—The question as to whether Professor Lowrie's scheme for horse-breeding societies was practicable or not was discussed. It was felt by the members of this Branch that local stallion owners had for the last 50 years obtained first class stallions, and therefore the need did not exist for the formation of a society in this particular part. Members, however, deplored that so many mongrel horses were travelling for hire in many parts of the State at a charge of from £1 to £1 10s. for service. This prevented the purchase of more good stallions for breeding draughts. Members trusted that much good would result, and that societies would be formed.

SEASON'S PROSPECTS.—The Hon. Secretary reported that the feed was better than usual for this time of the year, but the frosts were very trying to stock. Crops had gone in under favorable conditions, and were coming up well. The rainfall for June was 3.27in., and for the half-year ended June 30th, 11.13in.

Port Elliot, June 17.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. Welch (chair), Green, Pannel, Brown, McLeod, W. E. and W. W. Hargreaves (Hon. Sec.), and one visitor.

ANNUAL REPORT.—The Hon. Secretary reported that nine meetings had been held during the year with an average attendance of about eight. One homestead meeting had been held, and had proved very instructive. Papers had been read on the following subjects:—"How to Deal with Surplus Water," "Vegetable-growing," "Artificial Manures," "Clearing Farming Country," "Bureau Work," and discussion had taken place on "Black and White Magpies," "Varieties of Wheat," "Destruction of Mallee Shoots," "Manuring Grass Lands and Wheat Crop," "Killing Grass Trees (yacca)" "Cutting Posts," "Mortality among Young Pigs," "Roses," "Potatoes," "Rabbit Destruction," "Hay for Horses," "Fruit-growing," "Licensing Dairy Cows."

TREE-PLANTING.—A long discussion took place concerning tree-planting. Members considered the Maritime pine the best for shade, while the Remarkable pine was best for timber. Olive trees made a good shade, but needed cultivation to grow quickly. The berries were valuable for pigs and poultry, as well as for oil. Mrs. Green advocated lopping sugar gums about 6ft. from the ground about the end of December. It was advisable to put a coat of paint or a plaster of earth on the top.

SORREL.—Members thought that artificial manures encouraged the growth of sorrel. They advocated summer cultivation for the eradication of this weed.

Uraidla and Summertown, July 11.

(Average annual rainfall, 42½in.)

PRESENT.—Messrs. Hawke (chair), Day, Collins, Kessell, Curtis, Rowe, Hart, Richardson, H. F. and G. F. Johnson, Cobbledick, and Snell (Hon. Sec.).

DRAINAGE OF WET SOILS.—Mr. Day read a paper on this subject. He said that while open drains were very good, when underground drains were put in there was less inconvenience in working the soil. The former needed to be kept very clean, as they harbored vermin. Underground drains should be made with earthenware pipes, as wood rotted and stone was likely to silt up. For pipe drains a trench 2ft. or 3ft. deep by about 3ft. wide was required. Pipes should not be placed too close together, but the end should be put just into the flange. It should then be covered with stones and wood. The paper continued:—"Pipe drains can be used in summer for watering by blocking one end up and filling with water. To make wooden drains, dig a trench 3ft. deep, 2ft. 6in. wide, with a slight fall. Slabs should be split from the oldest of timber, as this lasts longer than young stuff. It should be 2ft. long and about 3in. thick. One man can split 400 to 500 of these slabs in a day. Poles 6in. to 8in. thick are required to form a shoulder in the bottom of the drain, then place the slabs on the poles; this makes a cheaper drain than could be made with pipes. If making drain through quicksand, put slabs both at the top and the bottom."

Willunga, July 1.

(Average annual rainfall, 25½ in.)

PRESENT.—Messrs. Pengilly (chair), Bigg, Binney, Wayne, Blacker, and Hughes (Hon. Sec.):

TRIP ON THE MURRAY.—Mr. Blacker, M.P., read an interesting account of his trip with the Parliamentary party which went up the Murray in December last and returned with the Scottish Agricultural Commissioners. During the whole of the trip evidences of prosperity were seen at every turn. Fruit-growing, dairying, wheat-growing, and stock-raising were seen in full swing, and the party felt sure that a great future awaited the Murray River country.

Woodside, July 12.

(Average annual rainfall, 31 in.)

PRESENT.—Messrs. Rollbusch (chair), Fowler, Sampson, Keddie, Spoeher, Kleinschmidt, Johnston, Keen, Lauterbach, Knuckey, Disher, Newman, and Hughes (Hon. Sec.).

VETERINARY SURGEONS FOR COUNTRY DISTRICTS.—Mr. Kleinschmidt read the following short paper, setting forth the need for more veterinary surgeons in the rural districts of the State:—"The wheat-growing and dairying districts of South Australia are greatly in need of qualified veterinary surgeons, and the sooner the farmers make up their minds to take some action the better. With good horses difficult to obtain, even at present high rates, owners must surely realise that something should be done to enable them to procure an expert capable of skillfully treating their sick and injured animals. For years the agriculturists in the northern areas have been talking about the introduction of veterinary surgeons, but in most cases they have failed to act—at any rate to the extent necessary to ensure the satisfaction of their desires. There are quite a thousand dairy cows, within a radius of a few miles, being milked in our district and the produce sent to factories. Surely that should entitle the farmer, who happens to have a sick cow, to the services of an expert. It is hoped that a movement which has been set on foot on Eyre's Peninsula will produce more satisfactory results. For some time correspondence has been passing between the various branches of the Agricultural Bureau there with a view to secure a sufficient guarantee to induce a veterinary surgeon to settle in the district. At a meeting of the Lipson Branch the proposal was accorded hearty support, and it was decided to obtain the required guarantors by the members of each Branch canvassing their respective districts. It is hoped that other branches around us will take this matter up and help us to bring this matter to a successful issue." In discussing the paper, members agreed that it was essential that some steps should be immediately taken to provide the necessary skilled attendance.

SOUTH-EAST DISTRICT.**Keith, June 10.**

PRESENT.—Messrs. J. Lambert (chair), Fillwood, Dall, Tyner, Leishmann, McCome, and Lock (Hon. Sec.).

PREPARATIONS FOR SEEDING.—Mr. Dall contributed the following paper:—"Preparations for seeding should begin fully 10 months before the time of sowing. Land should be fallowed as early as possible to a depth of from 3 in. to 4 in. After ploughing, work the land well with a cultivator or skim plough. Work it after rain if possible, as this will tend to conserve the moisture. If possible work the fallow across the ploughing, to break through any pieces that the plough has missed. When working the same way as it has been ploughed the cultivator is apt to slide over anything the plough has missed. For spring working a cultivator is better than a skim plough, as it leaves the land looser. After it has been ploughed with a skim plough it is more likely to set with a hard crust when the late spring rains fall. With new land one working in spring may be enough, but with old land it is advisable to work while there are any weeds to kill. After preparing the land the next consideration is the seed. Try to reap the wheat intended for seed before the main crop, as it will not be so likely to crack as it is if reaped later. It is as

well to select seed wheat from well-worked fallow. This will be more likely to give seed true to name and free from weeds. It is advisable to put the seed through the winnowing a second time to take out any broken grain. This will not grow, and will be worth more for feeding than the cost of putting it through the winnowing. Pickle the wheat with about one-third of a pound of bluestone to the 3bush. bag of wheat. A good way to pickle is to use a bran bag with a hoop around the top. Put this in the cask and drop the wheat through the water to the bottom of the bag. In this way one can be sure every grain has been wetted, and can take out any white heads. If two bran bags are used one can be draining while the other is in the pickle. Sow about a bushel to the acre, with about 70lbs. of super. Put a cultivator over the land before the drill, and harrow lightly after." The paper was freely discussed, and members agreed that 4in. was deep enough to plough in this district. From $\frac{3}{4}$ bush. to 1bush. of seed per acre was best. It was advisable to harrow after drilling.

Kingston, June 24.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. Jackson (chair), Goode, Flint, Lloyd, Clarke, Smith, Redman, Evans, and Barnett (Hon. Sec.).

DRAINAGE.—Mr. Wilson contributed a paper on this subject. He would proceed to make a drain where required, as follows:—In the first place he would find a good outlet, and from that work backwards and upwards. He would excavate to the full depth only if he knew there was time to complete the job before the rains set in. Otherwise he would only take out a little soil for the full length of the drain. After the rains had gone it could be made the desired depth. He would place floodgates in the drain, so that if desirable the land could be flooded.

Lucindale, June 24.

(Average annual rainfall, 22 $\frac{1}{2}$ in.)

PRESENT.—Messrs. Rayson (chair), Daw, Johnston, Secker, McMorran, Langberg, Beaton, W. Secker (Hon. Sec.), and four visitors.

PLANTING FOREST TREES.—The following paper was contributed by Mr. Secker:—"Trees should be obtained from the Forest Department in time to plant in the latter part of May, or earlier if there has been sufficient rain to make the ground moist enough to carry on this work; they then have a good opportunity to become well established before the summer sets in. I have found that one of the best practices is to make a nursery of the young trees directly I receive them. I have been able to save more of them by doing this than when they are planted out straight away. Fifteen inches each way is sufficient room to give them in a nursery, as they are only there for about 10 $\frac{1}{2}$ months. I would not advise making a nursery of sugar gums or manna gums, as they are too vigorous growers to treat in this way. My experience in this respect resulted in almost total failure. I made a nursery of 50 sugar gums, and before I could plant them out they were from 5ft. to 7ft. high. I cut them well back when I transplanted them, but out of the 50 only seven grew. With any of the pine family or red gums the nursery is the best practice, as you can place them in a fairly sheltered spot, and can give them more attention. Do not protect them too much, as they require to be fairly hardy when they are transplanted. In removing trees from the nursery prepare the hole first; this should be not less than 18in. square and 12in. deep, and the subsoil should be stirred 6in. or 9in. deep; then take the tree on the spade without disturbing the soil from the roots and place it in the hole, fill it in, and where possible give about half a bucket of water. This is not for the purpose of supplying the tree with water, but to firm the earth around the roots; the water drives any air from around the roots, and if the right quantity is used it gives the ground a natural firmness. If it is not practicable to have a nursery the young trees must be planted out permanently when they are received from the department. Some people look upon it as being too much trouble to plant trees, but they are well worth a place on the farm because of the many purposes they serve. Do not plant trees too close to dwellings or they will enclose the house too much when grown; 50ft. is near enough. Besides being ornamental, trees act as breakwinds to dwellings, orchards, and stock. Remarkable pines are the best to plant for a breakwind to an orchard, as they are the quickest growers. The pines should be planted 10ft. apart and not less than 35ft. from the fruit trees. A shelter for stock may be planted in any suitable vacant corner, but must be protected

while young. The practices of protecting trees with a bag or several old posts arranged as a cone over them are not good ones, as they do not get sufficient sunshine and ventilation, both of which are great contributors towards the growth of all plants and trees. Therefore I advise erecting a proper stock-proof fence; in the long run it is energy well expended. Let us assume that you have planted pines as your choice. Any stock will nip at them, and what is more disappointing than to find that your trees are progressing well and a horse or cow has nipped the centre out of some of them, thus spoiling the tree altogether. Trees which have been served in that way never make much growth. The most serviceable of all timbers is the red gum. The reason very little of this class of timber is planted is that the trees take so long to grow. To make a plantation they would require much more space on account of their spreading habit. Pines are most suitable for making a plantation, and secondly comes the sugar gum. To make a plantation of pines they may be planted not less than 12ft. apart. Last year I planted 500 pines 9ft. apart, but I have since concluded that this is a little too close. This latter distance might be all right for sugar gums. Any of the pine family will do well in sandy soils or where there is good drainage. The Aleppo pine will do better under wet conditions than any of the other varieties of pines, and the red gum and sugar gum will do well in almost any locality. The Wirrabara Forest was started 20 years ago, and last year the amount obtained for the sale of fruit cases was over £1,000. In Mount Gambier £1 per pine tree has been paid by Messrs. Wilcox & Co. for manufacturing into cases."

Millicent, July 11.

(Average annual rainfall, 28½ in.)

PRESENT.—Messrs. Mutton (chair), Hart, Oberlander, Mullins, Serle, Bowering, Gray, Nilson, and Day (Hon. Sec.).

CHARLOCK.—For the destruction of charlock Mr. Oberlander said mowing gave the best results. Mr. Hart had got rid of the weed by ploughing the land and sowing down with rye grass.

PEAS.—Some discussion took place on methods of harvesting peas and the difficulties of doing this in a windy district. Mr. Mutton favored mowing and leaving the plants in rows until they were ready to cart. Mr. Gray favored winding the plants into large bundles.

DESTRUCTION OF SPARROWS.—Mr. Mullins initiated a discussion on the sparrow pest. He thought more effective measures for destroying should be taken. He recommended treating them generously for several days to good wheat on newly cultivated land, then scatter phosphorized grain thickly. Mr. Bowering had poisoned practically all the sparrows on his homestead by this method. Members thought strychnine acted too quickly for sparrows. The poisoned birds died on the spot and frightened others away before many consumed the grain.

Mount Gambier, July 3.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Sassanowsky (chair), Watson, Kilsby, Holloway, Low, Smith, Major, Pritchard, Wedd, Sutton, Botterill, Ellis, Ruwoldt, Pick, Engelbrecht, Kennedy, Schlegel, Keegan, and Collins (Hon. Sec.).

ANNUAL MEETING.—The Hon. Secretary read his annual report, which showed that during the year 13 meetings had been held, with an average attendance of 14. Papers dealing with the following subjects had been read:—"Footrot in Sheep," "White Metalling Bearings," "The Best Way to Make Dairying Pay," "Show Judging," "How to Get Rid of Ferns on Poor Land," "How to Get Rid of Ferns on Good Land," "The Value of Paint to Farm Plant."

Naracoorte, July 3.

(Average annual rainfall, 22 in.)

PRESENT.—Messrs. E. Coe (chair), L. Wright, C. Bray, W. Loller, W. E. Rogers, J. D. and E. D. Tolmer, W. Munro, A. Langeludecke, jun., and S. Schinckel (Hon. Sec.).

CHAFF CUTTING AND FEEDING.—Mr. Rogers inquired what was the best length to cut chaff. He preferred it not less than ½ in. Mr. J. Tolmer said the length of the chaff should be governed by the age of the horse. He thought ½ in. was too long. One-third of an inch was the usual length. Mr. Loller thought ½ in. was the best all round. If the hay

was too dry it did not give a good sample of chaff. The hay should be damped well and given time to soak before cutting. Some horses bolted their food if the chaff was not long. He would prefer the chaff long for cows. Mr. J. Tolmer thought the mouthplate of the chaffcutter had something to do with the chaff being cut long. Mr. Schinckel said the mouthpiece of the chaffcutter was often the cause of the chaff coming out long. A piece of leather put underneath it generally overcame the trouble. He preferred the 3 in. length of chaff, but it was better for a horse that bolted its food to have a longer cut. The greatest objection to the short cut was that it became dusty in warm weather. He saw at Kybybolite a very good method of dealing with the dust trouble in horse boxes. It was the tacking of a piece of corrugated zinc at the bottom of the box. The dust could be overcome by damping the hay. He recommended putting salt in the hay when damping. Mr. J. Tolmer believed it a good thing to damp chaff, and if molasses was given with it it was still better for the horses. The Chairman used to damp his chaff when giving it to his horses, but several people had told him that it was a bad practice, as dirt and other refuse got mixed with the food, so he had discontinued the practice. Mr. R. Tolmer said that since his stallion had been fed on chaff damped with molasses it had improved very much.



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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

The late Mr. R. J. Needham.

The State has lost a valuable servant in Mr. R. J. Needham, Chief Inspector of Stock and Registrar of Brands, who died at his residence, Parkside, on August 17th, at the age of 66. He had been in failing health for some four months past, and had been absent from the office until quite recently, when he returned for a few days, in the hope that his condition was taking a turn for the better. Mr. Needham, who was the son of a Church of England clergyman, had been attached to the Stock Department for 30 years. In early life he gained experience as a bank clerk and then as a station manager, taking cattle overland to the Northern Territory for the late Dr. Browne. For 20 years he was stationed at the Burra as Inspector of Stock for the Northern District, and rendered valuable service in combating tuberculosis and other cattle diseases. When Mr. C. J. Valentine retired from the position of Chief Inspector, some six years ago, Mr. Needham took his place. The deceased gentleman was also a useful member of the Advisory Board of Agriculture. He was not only an efficient officer, but was possessed of a kindly disposition and displayed unfailing courtesy, both in private life and in the discharge of his public duties.

Anthrax at Plympton.

Early in August a serious outbreak of anthrax occurred among pigs kept near Plympton. It appears that the habit of the owner of the piggery was to buy up aged or moribund animals in and around the city, boil the flesh and feed it to his swine. After prolonged investigation, the officers of the Stock Department discovered what they believe to be the source of infection—two horses which died at a neighboring establishment, and whose flesh was cut up and fed to the pigs. Cultures made from the blood which remained on the ground where the cutting-up took place proved that the disease was anthrax. Several old manure sacks containing pollard and oats were found at the stables, and the Deputy Chief Inspector (Mr. T. H. Williams) thinks it likely that the anthrax germs were contained in the manure. A contaminated manure bag was found to be the source of infection in an outbreak of anthrax which occurred at Moonta two years ago. In the meantime the department has issued a warning to the public against the danger of buying horse or cattle feed in bags which previously contained any form of artificial manure. As regards the use of diseased flesh for pigs, the Government

Veterinary Surgeon (Mr. McEachran) reports—"It is quite evident that the superficial way in which diseased flesh is cooked for swine does not destroy the bacilli of anthrax or tuberculosis." All the pigs at Plympton on which *post-mortem* examinations were made proved to be infected with tuberculosis, and this is usually the case with swine fed on offal.

Identification of Weeds.

This is the season when weeds, especially annuals, should be got rid of before they flower and fruit. During this and the next few months it also becomes possible to identify weeds, whether they are native or introduced, old established residents or newcomers, about whose qualities the farmer may still be in doubt. It is very desirable that the secretaries of branch bureaux, or individual agriculturists, should send down to the Department of Agriculture flowering specimens of the weeds in their districts for identification. Each specimen should be accompanied by the local name, if it possesses one, as it would thus be possible to make a list of the names by which the same weed is known in different parts of the State. These names often vary from district to district, or a plant may be known by two different names in the same locality. Sometimes there is room for suspicion that an altogether wrong name is employed. Thus the Redhill Bureau, in its report of July 4th, gives "Canadian thistle" as "one of the most troublesome weeds" in that part. Now, the Canadian thistle, Californian thistle, or Creeping thistle (*Cirsium arvense*), is a very serious pest, propagating itself both by seed and by underground shoots. It is common in Tasmania and Victoria, where it has taken possession of the land in some places; but has only appeared once or twice in South Australia, and has not been recorded for years. Probably some other plant has been mistaken for this thistle; but in any case the Redhill Branch should send in specimens this season, so that it may be known whether the Canadian thistle has really invaded that district.

Fruit for the Continent.

The General Manager of the Produce Department (Mr. G. A. W. Pope) is in receipt of a communication from the Acting Trade Commissioner in London (Mr. J. B. Whiting), as follows:—"I have received an inquiry from a large firm here, asking if we can supply the names of firms who export apple cores and skins. I do not know if any export trade is done in these particular goods, but I understand there is a good market in Belgium for them, where they are used for making cheap jam. I have also had an inquiry from Germany for evaporated apples. My correspondents ask whether any lots

are obtainable, and at what price. These same German correspondents are buyers of other kinds of dried fruits, and there is no doubt that if supplies are available and the prices right, considerable quantities of dried apricots and other fruits could be placed in Germany."

Conference at Cherry Gardens.

The Annual Conference of Hills Branches of the Agricultural Bureau is to be held on October 5th at Cherry Gardens. The agenda paper is in the hands of the local Branch, and the Government Veterinary Surgeon (Mr. J. F. McEachran) will deliver an address. Members of the Agricultural Bureau who desire to attend the conference, and who travel part of the journey by rail, are reminded that *rail tickets* may be secured at *excursion fare*, provided application is made to the Department of Agriculture through the secretary of the Branch in time for a concession order to be posted. The conference will be open to anyone interested who may be able to attend.

Price of Imported Wheat in England.

The *Mark Lane Express Agricultural Journal*, in its issue of July 10th, points out that the recent rise in the wages of workers at shipping ports assists the British farmer (who is not an exporter) by further protecting him against the foreign and colonial producer. "It must not be forgotten," says that paper, "that extra cost of labor at the port of discharge means that more must be paid for the corn when landed, and that its price to the consumer, therefore, will in future be higher. The wages of an ordinary unloader of cargoes are now at most ports put up from 30s. to 32s. 6d. weekly, and dockers earn 6s. a day instead of 5s. Their work is hard, but the rise in the percentage of remuneration is material. These things favor the farmer as a grower of cereals to the extent that they diminish the chances of his being undersold."

Natural Incubators.

On a farm in a valley of the Colorado desert a new and strange method of hatching chickens is being practised. Many artesian wells are in this valley to furnish water for irrigation. One hole was drilled for 750ft. into the earth, and a flow of water came up with a temperature of 102°. Since chicks will hatch when eggs are kept just about as warm as this for 21 days, the people who own this well decided to use its heat to hatch eggs. The earth was dug away from the pipe so that the water as it flowed over formed

a pool in which an incubator can be submerged. A round can of galvanized iron was made, 18in. in diameter and 6in. deep, with a chimney projecting above the water. By stretching the arm and hand down this chimney the eggs are placed on straw in the bottom of the can. In this way they are turned twice each day, and out of the chimney the chicks are drawn when two days old. They are then placed in brooders. These chicks are as strong as any chicks have ever been.—*Agricultural Gazette*.

Diseases of the Prickly Pear.

Prickly pear has become such a nuisance in many parts of Queensland that the Government has spent large sums in trying to find the best means of eradication. Mr. Henry Tryon, the Entomologist and Vegetable Pathologist of that State, has been considering the question "of subjugating the notorious weed, prickly pear (*Opuntia vulgaris* and other species), by some malady—one of a parasitic nature especially incidental to it has been long submitted by this office as one worthy of consideration." In the *Queensland Agricultural Journal* for August Mr. Tryon gives an appalling list of the diseases to which species of *Opuntia* are subject in different countries, ranging from Italy to South Africa and Argentina. The names of 39 species of fungi which infest prickly pears, sometimes with fatal effect, are quoted. A list is also given of nine "insect enemies of the prickly pear," most of them foreign, which it is believed might prove useful in killing or weakening the plant if introduced into Queensland. It is to be hoped that the Board of Advice on Prickly Pear Destruction, to which Mr. Tryon has submitted his report, will exercise a wise discretion, or else some new insect or fungoid parasites may be introduced into Australia, and spread from the prickly pear to fruit trees or vegetables. It transpires, from Mr. Tryon's researches, that in Argentina one species of spineless *Opuntia* is cultivated as a forage plant in the arid regions.

California Fruit Prospects.

A recent issue of the *Pacific Rural Press* contains reports on the prospects of the various deciduous fruits. The market is said to be practically bare of dried fruit, and with a strong demand prices are appreciating owing to probable shortage in apricots, prunes, and peaches. Prunes are estimated to give only 40 per cent. of a full crop, while apricots in the largest producing centres show from 40 per cent. to 60 per cent. Peaches and almonds are also short and prices firming. Dried apricots are being bought from the grower at 11 cents. per pound, against last year's opening price of 7 cents. If the present

prospects do not improve it is very probable that London will offer a profitable outlet for first-quality dried apricots from this State. Last season Major Norton strongly urged trial shipments on account of the profitable rates ruling, but emphasized the necessity of sending only first-quality well-graded fruit.

Cheap Food for Ducks.

After ducklings get a fortnight old, a cheap food is fine, chopped lettuce, mixed with a little barley meal and milk, if any. Ducklings are such big eaters that they are scarcely profitable unless raised on cheap food. Abundance of lettuce can be grown on a small patch of land in any odd corner, and the cost is the best variety. Lettuce is very milky, and ducklings like it. Says Mr. N. Allen, in *Poultry World*, "I have known whole groups of ducklings raised on chopped lettuce, mixed with barley, at a very trifling cost, but more substantial food must be given the last fortnight before killing. I have used bucketsful of chopped lettuce daily among ducklings, and always obtained remarkable results, but it must be mixed with some barley meal."

The American Beef Trust.

The New South Wales Minister for Agriculture, in the course of an address before the Farmers' and Settlers' Association a few days ago, announced that he had discovered that the Yankee Trust had commenced operations in Australia. He said that he had certain information to the effect that they had large quantities of Australian meat secured in Sydney and on the water in course of transport to England. The work was being carried out very carefully and insidiously. For some time past the Trust had been conducting investigations as to the present value of the existing meat works in this State, and the possibility of buying them up. He had much information, of which he could not now make use without prejudicing the interest of the very men whom the Government wished to protect. It was intended, if necessary, to appoint a Royal Commission to deal solely with the operations of the Trust. Everything that could be done to defeat the objects of the Trust and to safeguard the interests of the producers would be carried out. The latest news regarding the Trust's operations in South America is contained in the following paragraph, supplied by our Buenos Aires correspondent, and dated June 6th:—"It has been reported in a local paper that representatives of the American Beef Trust have been operating in the London market, and have either been acquiring shares of the freezing companies operating in Argentina or have made arrangements with large shareholders to acquire the shares they hold, and thus obtain a controlling vote. From

Uruguay comes the report that one of the American firms has purchased the Cibils Saladero, and will erect large freezing works on the site. This is their answer to the Sansinena Company for having outbid them over the Uruguay freezing works. Another of the companies is said to have purchased a site at the port of La Plata, and will commence the erection of works there, which will make three works in that port."—*Pastoralists' Review*.

An English View of the Starling.

A good deal has been written about that common British bird, the starling; and while he is commended on the one hand as being useful, he is condemned on the other for certain mischievous propensities that are part of his nature. The other day we heard a cherry-grower saying all sorts of hard things about starlings because the latter were taking toll of his fruit, and we could not help thinking then that if he had no starlings to bother him he might have something worse. We were led to this thought by an experience of a week or two before when we had an opportunity of watching a pair of starlings. They had a nest under the slates of a building, and, judging from the continuous chattering, there was a very hungry family therein. All through that long, hot day—and, of course, through other days as well when we did not see them—the parent birds flew backwards and forwards every few minutes, but they never returned without a grub or caterpillar in their beaks. Thus it is that by one creature making prey of another we get the balance of Nature, and the starling displays the useful side of his character.—*Mark Lane Express Agricultural Journal*.

Fertilising Value of Lucerne.

When in his system of rotation the farmer is ready to plough up his lucerne he has another inestimable contribution to the land's fertility in the stubble and roots. It is not recommended to plough under any considerable growth as a green manure, as the hay crop is too valuable. Its market value would buy more fertilisers than the same growth is worth for humus. After a field has stood for five or six years the roots have added largely to the humus content. Professor W. P. Headden, of Colorado, estimated that the fertilising value of the stubble and 6½ in. of roots ploughed under is about 20 dollars per acre, while the value of the stubble and entire root system is not less than 35 dollars per acre.—F. D. COBURN ("The Book of Alfalfa").

New Lands.

The Moorak Estate, near Mount Gambier, is open for application in blocks of convenient sizes until September 19th. It comprises 4,306 acres of first-class land suitable for intense cultivation, and the average price paid for it by the Government was £31 10s. per acre. Lands in the new hundreds of Rudall, Yadnarie, Brooker, Moody, and Boothby, on Eyre's Peninsula, will be gazetted as open for application in a few weeks. They comprise in all an area of about 168,000 acres. The next lands to be offered along the authorised railway from Tailem Bend to Brown's Well will be in the hundreds of Vincent and Wilson. They consist of about 160,000 acres, and will be gazetted in six weeks' or two months' time.

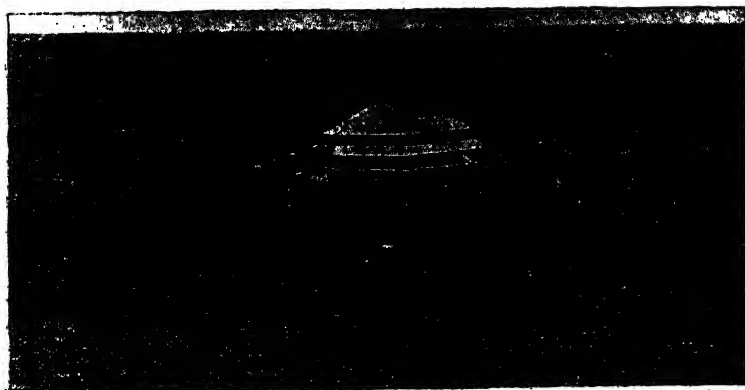
Sugar Beet.

Several years ago the Victorian Government established a beet-sugar factory at Maffra, in Gippsland. In the early days the factory did not meet with much success, but, judging by an article from the pen of the general manager (Mr. Harry T. Easterby) which appears in the August number of the *Victorian Journal of Agriculture*, a more prosperous era for the industry has begun. Mr. Easterby says—"To those who are within a reasonable distance of the Maffra factory, say up to 80 or 90 miles, we say, 'grow beet for the factory; it will pay you handsomely.' One pound per ton is to be paid for topped beets delivered at the factory, and from 10 to 20 tons can be grown, according to the character of the soil and the attention given to the cultivation. The Government also undertakes to pay all railway freight over 3s. per ton, so that the growing of beet this year in those districts along the Gippsland line where potatoes proved such a disastrous crop last year should be very profitable. Land that has been under potatoes is likely to be very suitable for beet, and much of it will not need subsoiling. The following are a few of the results from growers around Maffra and further afield who planted beet last season:—Mr. B. C. Martin, Tinamba, grew slightly under three acres of beet, and paid for every detail at contract rates, allowing 30s. per acre for rent of land. His total expenses were £33 4s. 3d., whilst his receipts amounted to £48, so that he made slightly over £5 per acre, without the value of the pulp, which he received free at the factory. Mr. T. Vance netted £14 16s. 7d. from one acre of beets after paying 6s. for seed. As Mr. Vance carried out all his own work, he is more than pleased and satisfied with the result. Mr. C. Rowley secured 40 tons of beet from two acres at Newry. After paying for seed, thinning, carting, and rent, he came out with a profit of £10 per acre. Mr. G. C. Johns, of Sale Road, grew three acres of beet, and made over £5 per acre net. A crop of wheat he grew only gave him £4 per acre. Messrs. French Bros., the largest individual growers in the Maffra district, put in about 18 acres under beet. They paid

contract rates for thinning, hoeing, and topping, and were enabled to put £100 in the bank, while their cereal crops are still awaiting sale. What sugar beet growing has done for Europe and the United States it can also do for Victoria. Since the introduction of beet into Germany the productivity of the farms in that country has more than trebled. This is due to the fact that sugar beet is a payable crop which can only be successfully grown by applying to its culture the common-sense rules that govern any profitable industry. Victoria pays out nearly a million pounds for her sugar. Is there any reason why a large part of, if not all, the sugar consumed in this State should not be made in Victoria, and this large sum diverted into the pockets of our farmers ? ”

Imports and Exports of Fruits and Plants.

During the month of August 11,876bush. of fresh fruits, 906 bags of onions, 3,352 bags of potatoes, and 61pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885 ; 106bush. of bananas, 22bush. of mandarins (chiefly over-ripe), and 120 bags of potatoes were rejected. Under the Federal Commerce Act 1,188 cases of fresh fruit, 82pkgs. of preserved fruit, 920pkgs. of dried fruit, 50pkgs. of honey, and 3pkgs. of plants were exported to oversea markets during the same period. These were distributed as follows :—For London, 82 cases of oranges, 4pkgs. dried fruit, and 50pkgs. honey ; for Germany, 72 cases oranges ; for New Zealand, 1,033 cases citrus fruits, 890pkgs. dried fruit, 50pkgs. preserved fruit, and 3pkgs. plants ; for India and East, 1 case oranges, 32pkgs. preserved fruit and 26pkgs. dried fruit. Under the Federal Quarantine Act 1,174pkgs. plants, seeds, bulbs, &c., were admitted from oversea sources.



ALLENDALE HOMESTEAD, OODNADATTA.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

EFFECT OF TURPENTINE ON HORSE'S STOMACH.

"Bowhill" asks—"Is turpentine injurious to a horse's stomach?"

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Large doses of turpentine produce irritation of mucous membrane of stomach and intestines. Medicinal doses in a suitable base, e.g., raw linseed oil, and properly administered will have no injurious effect on the digestive tract."

COW OVERFED WITH WHEAT.

"Davenport" asks for advice as to treatment of a cow which had eaten a large quantity of wheat.

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Treat as for 'hoven.' Use certain agents used to decompose gases, e.g., 1oz. to 2oz. of hyposulphite of soda in a pint of water, or 2ozs. aromatic spirits of ammonia in water, or turpentine 2ozs. and raw linseed oil 1 pint. Restrict diet and give dose of Epsom salts and treacle. If rumen much distended and cow distressed and in pain, owner should immediately puncture rumen with trocar and cannula on the left side in the space between the angle of the paunch, the transverse processes of the vertebrae of the loins, and the last rib. The application of cold water to the abdomen is sometimes effectual in neutralising gases."

RAPE AND MAIZE.

"Cinque" asks—(1) Could one expect a crop of rape on 'salty' soil if sown in September and irrigated? (2) What is the best variety of maize for green fodder, plenty of water being available?"

Answer—" (1) This question cannot be answered until the degree of alkalinity or saltiness is known. With a small percentage of salt, rape might succeed; but mangels would tolerate considerably more salt than would rape. (2) Respecting the second question, the best variety of maize for green fodder would, in your case, probably be 'Hickory King.'

MIXING MANURES.

"Y. X.," Penola, wishes to know what manures must not be mixed together.

Answer—"Thomas phosphate or basic slag, lime and ashes should never be mixed with superphosphate, sulphate of ammonia, farmyard manure, guano, blood manure. If it is desired to make any of the following mixtures it should only be done immediately before use :—Kainit, sulphate of potash, mixed with basic slag, superphosphate, lime, ashes. Nitrate of soda mixed with superphosphate, basic slag."

RYE AS HAY.

"H. W.," Pinnaroo, asks—"Would rye cut very green do for hay, or would it dry too tough? At what stage of growth would be best to cut it?"

Reply—"As a rule stock do not like rye cut for hay, although they will eat it. It should be cut just in the shot blade stage, before it is in bloom."



ORCHARD AND HOMESTEAD.

ROSEWORTHY AGRICULTURAL COLLEGE.

Fourth Report on the Permanent Experiment Field, Seasons 1909-10 and 1910-11.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College,
and W. J. SPAFFORD, Assistant Experimentalist.

(Continued from page 25.)

MISCELLANEOUS MANURE PLOTS OF WHEAT GROWN AFTER BARE FALLOW.

These plots, the returns from which cover five seasons, 1906-10, comprise wheat treated with basic slag, with farm yard manure, and with a combination of superphosphate and nitrate of soda, comparatively with wheat treated with superphosphate alone and with wheat without manure.

TABLE XXXII.—*Showing 1906-10 Returns from Miscellaneous Manure Plots
of Wheat after Bare Fallow.*

Year.	Plots.	Total Produce per Acre.			Grain per Acre.		Straw to 60lbs. of Grain.	Bushel Weight.
14 TONS OF FARMYARD MANURE TO THE ACRE.								
		tons	cwts.	lbs.	bush.	lbs.	lbs.	lbs.
1906 ...	41	1	19	50	16	4	210	56½
1907 ...	42	1	1	6	14	31	102	62½
1908 ...	41	2	0	80	23	17	136	63½
1909 ...	42	2	16	85	33	23	130	63½
1910 ...	41	2	10	83	24	2	176	62½
Means..	—	2	1	83	22	15	151	61½
NO MANURE.								
1906 ...	52	2	0	91	15	57	226	56½
1907 ...	53	0	18	17	13	21	92	62½
1908 ...	52	2	0	96	24	33	126	65½
1909 ...	53	2	6	97	26	2	142	63½
1910 ...	52	1	18	9	18	29	171	64½
Means..	—	1	16	107	19	40	151	62½

TWO HUNDREDWEIGHT OF BASIC SLAG TO THE ACRE.

Year.	Plots.	Total Produce per Acre.			Grain per Acre.		Straw to 60lbs. of Grain.	Bushel Weight.
		tons	cwts.	lbs.	bush.	lbs.		
1906 ...	54	2	3	44	18	21	205	56½
1907 ...	55	0	17	106	14	8	82	64
1908 ...	54	2	4	45	26½	44	126	64½
1909 ...	55	2	14	100	30	59	138	63½
1910 ...	54	2	8	9	25	7	155	64½
Means..	—	2	1	83	23	4	141	62½

THREE HUNDREDWEIGHT OF BASIC SLAG TO THE ACRE.

1906 ...	56	2	2	52	19	39	182	57½
1907 ...	57	0	17	82	13	58	82	63½
1908 ...	56	1	15	45	32	13	63	64½
1909 ...	57	2	19	56	33	20	141	64
1910 ...	56	2	3	100	19	58	186	64½
Means..	—	1	19	93	23	50	131	62½

TWO HUNDREDWEIGHT OF SUPERPHOSPHATE TO THE ACRE.

1906 ...	58	2	11	60	20	49	217	56
1907 ...	59	0	19	13	14	58	83	64
1908 ...	58	3	1	111	38	20	121	64½
1909 ...	59	2	15	16	31	2	141	63½
1910 ...	58	2	3	76	19	11	195	63½
Means..	—	2	6	43	24	52	151	62½

TWO HUNDREDWEIGHT OF SUPERPHOSPHATE AND QUARTER HUNDREDWEIGHT OF NITRATE OF SODA TO THE ACRE.

1906 ...	60	2	3	108	20	51	176	56
1907 ...	61	1	3	10	17	48	85	63½
1908 ...	60	2	18	32	37	46	113	64½
1909 ...	61	2	11	49	33	40	107	63½
1910 ...	60	2	8	38	19	0	227	64½
Means..	—	2	5	3	25	49	142	62½

In Table XXXIII. below, we have compared the average returns of the five seasons from the miscellaneous manure plots with those of no-manure plots 52 and 53, and 2cwts. superphosphate plots 58 and 59 respectively.

TABLE XXXIII.—*Comparison of Average Yields of Miscellaneous Manure Plots with those of No-Manure and 2cwt. Superphosphate Plots respectively.*

DIFFERENCES WITH NO-MANURE PLOTS.

Manures per Acre.	Value at		Value at	
	As Hay.	30s.	As Grain.	3s. 6d.
	cwts. lbs.	s. d.	bush. lbs.	s. d.
None	—	—	—	—
2cwts. superphosphate	+ 9 48	+ 14 2	+ 5 12	+ 18 2
2cwts. superphosphate and ¼cwt. nitrate of soda	+ 8 8	+ 12 1	+ 6 9	+ 21 6
2cwts. basic slag	+ 4 88	+ 7 2	+ 3 24	+ 11 11
3cwts. basic slag	+ 2 98	+ 4 4	+ 4 10	+ 14 7
14 tons farmyard manure	+ 4 88	+ 7 2	+ 2 35	+ 9 0

DIFFERENCES WITH TWO-HUNDREDWEIGHT SUPERPHOSPHATE PLOTS.

Manures per Acre.	As Hay.	Value at 30s.				Value at 3s. 6d.			
		cwts. lbs.	s.	d.	bush. lbs.	s.	d.		
None	— 9 48	— 14	2	— 5	12	— 18	2		
2cwts. superphosphate	—	—	—	—	—	—	—		
2cwts. superphosphate and $\frac{1}{4}$ cwt. nitrate of soda	— 1 40	— 2	0	+ 0	57	+ 3	4		
2cwts. basic slag	— 4 72	— 7	0	— 1	48	— 6	4		
3cwts. basic slag	— 6 62	— 9	10	— 1	2	— 3	7		
14 tons farmyard manure	— 4 72	— 7	0	— 2	37	— 9	2		

The conclusions to be derived from these five seasons' records summarised in Tables XXXII. and XXXIII. may be stated as follows:—

1. A dressing of 2cwts. of superphosphate to the acre has had the effect of increasing the average hay yield by close on half a ton to the acre, and the average grain yield by over 5bush. to the acre, relatively to continuously unmanured plots.

2. In this case, contrary to what has elsewhere been the case, the increases due to superphosphate both in total produce and in grain are strictly proportional one to the other; that is to say, the relationship between straw and grain is the same in both the no-manure plots and the 2-cwt. superphosphate plots, viz., 151lbs. of straw and chaff to 60lbs. of grain.

3. When compared with the other manures used here, superphosphate alone proved itself superior both in grain and hay yields, with the exception of the plots to which $\frac{1}{4}$ cwt. of nitrate of soda was added to 2cwts. of superphosphate, and in which there was a slight increase in grain, but none in hay.

4. All the manure plots have given heavier returns both of hay and grain than the continuously unmanured plots.

5. Basic slag or Thomas phosphate, which is a less soluble form of phosphatic manure than superphosphate, has in all directions proved itself inferior to the latter, whether used at the rate of 2cwts. or 3cwts. to the acre. The basic slag plots have, however, shown marked improvement in 1909 and 1910.

6. The superiority of the superphosphate plots over the basic slag plots is greater in the matter of hay than in that of grain; hence the relationship of straw to grain in the basic slag plots—131lbs. and 141lbs. of straw to 60lbs. of grain—proved lower than was the case in either the superphosphate or the no-manure plots. We may infer, therefore, that basic slag influences the wheat plant more towards grain than towards straw production.

7. The average bushel weight of the basic slag plots is $\frac{1}{2}$ lb. greater than that of the superphosphate plots, and $\frac{1}{4}$ lb. greater than that of the no-manure plots.

8. The farmyard manure plots, whilst in the first three years very little better than the no-manure plots, improved very considerably in 1909 and

1910. This improvement we attribute very largely to a general improvement in the mechanical condition of the soil arising from repeated dressings of organic manure. We are inclined to think that if superphosphate were to be used simultaneously with farmyard manure, the results would be even more satisfactory. In order to test this point we are establishing this season new plots, which will be dressed continuously with both farmyard manure and superphosphate.

9. Increases in yield which may be attributed to the action of farmyard manure have borne equally on both grain and straw alike; and in the farmyard manure plots the relation of straw to grain remains the same as that of the no-manure and superphosphate plots.

10. The average bushel weight of the farmyard manure plots is 11b. below that of the no-manure plots, and generally lower than that of all the manure plots included in this series,

11. The farmyard manure plots, whilst considerably below the superphosphate plots in the first three years, were above them in 1909 and 1910 both in grain and hay yields.

12. The addition of $\frac{1}{4}$ cwt. of nitrate of soda to the normal 2-cwt. dressing of superphosphate, has had the effect of increasing the average grain yield by one bushel above that of the plots treated with superphosphate alone. The value of $\frac{1}{4}$ cwt. of nitrate of soda is about 3s. 6d.; that is to say, approximately the same as that of a bushel of wheat.

13. Again, we notice no improvement in the hay yield from the use of $\frac{1}{4}$ cwt. of nitrate of soda, confirming our previous observations to the effect that under our conditions of climate nitrate of soda does not appear to stimulate the wheat plant towards straw and flag growth at the expense of grain production; indeed, in the plots that had been dressed with nitrate of soda the relation of straw to grain proved lower than was the case in the no-manure and superphosphate plots.

VARIOUS MANURES FOR WHEAT AFTER BARE FALLOW ON PLOTS PREVIOUSLY CONTINUOUSLY UNDER WHEAT, SEASON, 1909-10.

In the first three years of the establishment of the Permanent Experiment Field, the plots with which we are now concerned were kept continuously under wheat from year to year. Beyond the third season, we were unable to go; weeds literally drove us out of the field. We were compelled, therefore, in 1908 to treat all the plots as bare fallow. In 1909 they were sown again to wheat, and treated with the same manure dressings as in the preceding three years of cropping. The results of continuous cropping have already been dealt with finally in the third report of the Permanent Experiment Field; and there is nothing to be gained by repeating them here. We give

therefore, below, in Table XXXIV., results secured on these plots in 1909, following a year of bare fallow :—

TABLE XXXIV.—*Showing 1909 Returns of Various Manures on Wheat after Bare Fallow.*

Plots.	Manures per Acre.	BARE FALLOW.					
		Total Produce per Acre.		Grain per Acre.		Straw to Bushel 60lbs. of Weight.	
		tons.cwts. lbs.	bush. lbs.	lbs.	Grain.	lbs.	lbs.
44	No manure	1 17 96	31 55	73	63½		
40	2cwts. superphosphate	3 0 21	31 27	154	64½		
34	2cwts. superphosphate and ¼cwt. nitrate of soda	3 7 94	35 55	152	62½		
35	2cwts. superphosphate and 1cwt. nitrate of soda	3 5 93	35 37	147	63½		
*43	3cwts. superphosphate and 1cwt. nitrate of soda	2 18 53	35 17	126	63½		
51	2cwts. superphosphate and ¼cwt. nitrate of soda	3 4 91	35 39	144	64½		
*45	2cwts. superphosphate and ¼cwt. sulphate of ammonia	3 4 106	37 32	134	64½		
46	2cwts. superphosphate and 1cwt. sulphate of ammonia	3 2 47	36 42	130	63½		
36	2cwts. superphosphate and ¼cwt. sulphate of potash	3 8 0	39 1	135	62½		
37	2cwts. superphosphate and 1cwt. sulphate of potash	3 0 102	34 4	140	62½		
*47	2cwts. superphosphate and ¼cwt. muriate of potash	3 1 4	34 1	141	63½		
48	2cwts. superphosphate and 1cwt. muriate of potash	3 1 82	36 38	137	64½		
38	2cwts. superphosphate, ¼cwt. nitrate of soda, and ¼cwt. sulphate of potash	3 0 91	36 10	128	63		
39	2cwts. superphosphate, 1cwt. nitrate of soda, and 1cwt. sulphate of potash	2 19 24	35 41	126	63½		
*49	3cwts. superphosphate, ¼cwt. nitrate of soda, and ¼cwt. muriate of potash	2 19 104	38 6	116	63½		
*50	3cwts. superphosphate, 1cwt. nitrate of soda, and 1cwt. muriate of potash	3 3 59	35 59	138	64½		

Thus Table XXXIV. shows the yields of these variously manured plots to have been exceedingly heavy in 1909 ; indeed, for an equal area they represent, within our knowledge, the heaviest average yields ever secured on the College Farm. The total of area of these 16 plots is about 32 acres, and this area yielded grain at the rate of 35bush. 36lbs. to the acre, and total produce, or hay, at the rate of 3 tons 1cwt. 11lbs. to the acre. Apart from the fact, which must be recognised, that 1909 proved eventually one of the finest seasons within our experience, we look upon these high yields as very much of a testimonial to the value of bare fallowing, and thorough preparation of the soil for wheat. For three years in succession, 1905–07, 11 of these plots were under wheat, whilst five of them (those marked with an asterisk in Table XXXIV.) were under wheat both in 1906 and 1907. By 1907, however, yields had fallen away to such an extent that we found ourselves compelled

to treat as bare fallow the whole of the area in 1908. What these earlier returns were we have already indicated in earlier reports, and we do not intend repeating them here. For purposes of comparison, however, and with a view to emphasising the value of bare fallow, we append below, in Table XXXV., the average hay and grain yields, of the 11 plots that were continuously under wheat from 1905 to 1907, comparatively with the averages secured on these same plots in 1909 after a year's bare fallow. It should be stated that in each year in which these plots came under wheat, they were regularly treated with the manure dressings already indicated in detail in Table XXXIV.

TABLE XXXV.—*Showing average yields of 11 Plots continuously under Wheat, 1905–1907, treated as Bare Fallow in 1908, and again under Wheat in 1909.*

Year.	Total Produce per Acre.			Grain per Acre.	
	tons	cwts.	lbs.	bush.	lbs.
1905	2	9	95	26	10
1906	1	4	47	8	10
1907	0	7	28	5	23
1908			Bare Fallow.		
1909	3	0	48	35	34

The contrast between inefficient and efficient soil preparation before wheat could not be greater than that given by a sudden rise in total produce from 7cwts. 28lbs. to over 3 tons per acre, and in grain from 5½bush. to over 35½bush. to the acre. It should not be overlooked, however, that no one of the three seasons during which the plots were continuously under wheat were at an equal to 1909. The relative merits of the four seasons may, however, be gauged by the average yields secured during each year on 15 other plots of the Permanent Experiment Field, which have throughout been put under wheat after a year's bare fallow. The average grain yields of these plots were respectively 28½bush. in 1905, 20bush. 3lbs. in 1906, and 16bush. 8lbs. in 1907; but 30 bush. in 1909. Hence, whilst the differences between the four seasons were certainly great, they were by no means in proportion with those set out in Table XXXV.

No-Manure Plot.—The yields of this plot—viz., 1 ton 17cwts. 76lbs. of total produce or hay, and 31bush. 55lbs. of grain—are certainly very surprising for the fourth crop of wheat raised altogether without manure of any kind throughout the course of five years. It should be noted that the proportion of straw to grain was very small, namely only 73lbs. of straw to 60lbs. of grain; the wheat heads, on the other hand, were very heavy and exceptionally well weighted with grain. All these points are clear evidence of an exceptionally favorable and very late season.

The Superphosphate Plot.—This plot shows an increase of 1 ton 2cwts. 37lbs. of total produce, or hay, over the no-manure plot, but no increase in grain; hence, a marked increase in the proportion of straw to grain. The returns

from all the other plots must be compared with this plot, since in addition to other manures all have received a regular dressing of superphosphate.

The Nitrate of Soda Plots.—Of these we have four, namely plots, 34, 35, 43 and 51. Plots 34, 35, and 51 all received 2cwts. of superphosphate, and in addition 1cwt., $\frac{1}{2}$ cwt., and $\frac{1}{4}$ cwt. of nitrate of soda respectively, whilst plot 43 was dressed with 3cwts. of superphosphate and 1cwts. of nitrate of soda.

In total produce, or hay, three of these plots show heavier returns than the superphosphate plots, whilst those of plot 43 are slightly below those of the latter. The increase is greatest in the case of plot 35, dressed with $\frac{1}{2}$ cwt. of nitrate of soda; it is represented by 7cwts. 73lbs., of a value of about 12s. 6d., which more than covers the cost of the manure, viz., 7s.

In the matter of grain the yields of all four plots are so similar as to imply that in this season at all events $\frac{1}{4}$ cwt. of nitrate of soda to the acre was all that was needed to secure the maximum possible yields under this form of manuring. The difference between the $\frac{1}{4}$ cwt. nitrate of soda plot and the superphosphate plot, viz., 4bush. 12lbs., leaves a handsome profit after paying for $\frac{1}{4}$ cwt. of nitrate of soda, at 14s. a hundredweight.

We may conclude, therefore, that in 1909 light dressings of nitrate of soda, when combined with 2cwts. of superphosphate proved distinctly profitable.

Sulphate of Ammonia Plots.—Of these we have two, viz., plot 45, with a dressing of $\frac{1}{2}$ cwt., and plot 46, with a dressing of 1cwt. of sulphate of ammonia to the acre. Each plot received in addition 2cwts. of superphosphate. Here again we find higher yields both of grain and of hay on the plot in receipt of the lighter dressings of manure. This feature is so general throughout this series of plots—and indeed in our experience has proved so in past years as well—that we are inclined to the opinion that an excess of soluble salts in the soil has, if anything, under our special conditions of climate, a depressing influence on the yields and growth of wheat.

The grain increase of plot 45, dressed with $\frac{1}{2}$ cwt. of sulphate of ammonia above the superphosphate plot, exceeds 6bush., representing a handsome profit after paying for the manure at the rate of 14s. a hundredweight. The increases in total produce, or hay, however, barely pay for the manure in plot 45, and are below its value in plot 46. Relatively to the nitrate of soda plots sulphate of ammonia appears to have stimulated grain production rather than straw.

Sulphate of Potash Plots.—These comprise plots 36 and 37. For the first time in our experience on the College Farm, in 1909 the combination of superphosphate and sulphate of potash proved superior in its influence on both grain and straw yield over superphosphate alone. These increases, however, are more marked in the matter of grain than of straw, for whilst in plot 40 the relation of straw to 60lbs. of grain is represented by 154lbs. it is as low as 130lbs. and 135lbs. in plots 36 and 37 respectively.

We have here again an example of the depressing influence of excessive quantities of soluble manure in the soil. The grain increase resulting from

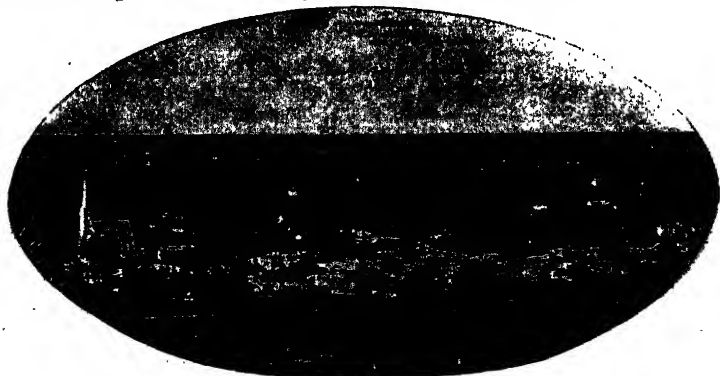
the use of 1cwt. of sulphate of potash is represented by $2\frac{1}{2}$ bush., which is much below the value of the manure at 14s. a hundredweight. The hay increase in the same plot of 91lbs. is even more unprofitable. On the other hand, the grain increase following on the application of $\frac{1}{2}$ cwt. of sulphate of potash is represented by $7\frac{1}{2}$ bush., which, after paying for the manure, leaves, at 3s. 6d. a bushel, a profit per acre of 19s. 3d., whilst at 30s. a ton the hay increase of 7cwts. 91lbs. leaves a profit of 4s. 8d. an acre.

It is extremely unwise to attempt to generalise from the results of a single season; and if in 1909 potash manures have certainly given us profitable increases of both grain and hay, it behoves us to recollect that this is the only season in which this has proved to be the case.

Muriate of Potash Plots.—Plots 47 and 48 were dressed with both superphosphate and muriate of potash. The hay increases of these plots above the superphosphate plot (95lbs. and 1cwt. 61lbs. per acre respectively) are neither of them profit-bearing. The grain increases, on the other hand, after paying for the manure, leave at 3s. 6d. a bushel profits of 2s. and 4s. 1d. respectively to the acre. In the present instance the heavier dressing of muriate of potash does not appear to have had a depressing influence on the yields of either grain or hay.

Combined Superphosphate, Nitrate of Soda, and Sulphate of Potash Plots.—Under this heading are included plots 38 and 39. Relatively to the plots in which superphosphate alone was used no improvement in the hay yields is perceptible. Grain yields, on the other hand, show improvements of 4bush. 43lbs. and 4bush. 14lbs. respectively, leaving a slight profit in the case of plot 38 and a loss in the case of plot 39.

Combined Superphosphate, Nitrate of Soda, and Muriate of Potash Plots.—These comprise plots 49 and 50, in both of which the dressing of superphosphate has been raised to 3cwts. to the acre. There is no hay increase in plot 49, whilst the increase in plot 50 has been secured at a loss. The grain increase in plot 49 at 3s. 6d. a bushel leaves a profit of 4s. 9d. an acre, whilst, again, the increase in plot 50 does not pay for the manure used.



A Glimpse of Mount Gambier.

BITTER PIT.

THE JOINT INVESTIGATION.

METHODS OF INQUIRY.

The Federal and State Governments having come to an understanding as regards the investigation into the origin of bitter pit in apples, Mr. D. McAlpine (Vegetable Pathologist of Victoria) is resigning his position under the Victorian Department of Agriculture in order to conduct this important inquiry. He has forwarded to the South Australian Department of Agriculture the following outline of the scheme which he proposes to adopt :—

There is such a conflict of opinion as to the cause of bitter pit, and consequently of the measures to be taken in dealing with it, that it is absolutely necessary to have some solid foundation of fact to go upon. I propose, therefore, to carry out a series of exact experiments and systematic observations, both in the laboratory and in the orchard.

In the orchard those factors will receive first attention which are more or less within the control of the orchardist himself; and here I wish to point out that the mistake is often made in studying this disease of confining attention entirely to the fruit of the apple or pear, whereas the fruit is only the outcome of various antecedent conditions, so that every possible factor which contributes to the growth of the tree, as well as the formation of the fruit, will require to be taken into account.

There are three principal lines of investigation that will be followed, viz., manuring, pruning, and stocks for propagation.

1. The influence of manures or different kinds of plant food on the development of the disease.

2. The influence of different methods of pruning in regulating the distribution of the fruit on the tree, as well as the nutritive juices to different parts.

3. The internal factor, or heredity, will be studied in so far as it is influenced by the variety of the stock used for propagation.

Attention will also be paid to the influence of different cultural methods in conserving the moisture for the use of the tree when most wanted, and promoting uniform growth.

The question of plant food is closely associated with that of soil moisture, and the available quantity of moisture determines, in a large measure, whether the fruit will reach its normal size or not.

Experiments on these main lines will be started at once in the different States concerned, and various theories as to the cause of bitter pit will be tested, as well as various practices which have an influence on it. Among other things investigations will be undertaken during the coming season to settle the question how, when, and where does the disease first appear in the fruit.

There are numerous other experiments to be carried out in due course, but the point I wish to insist on is this: that the main object of these experiments will be to determine as far as possible what practices are beneficial, and thus arrive at some reasonable and practical means of dealing with this menace to the fruit industry.

As regards the three principal lines of investigation mentioned by Mr. McAlpine—namely, manuring, pruning, and stocks for propagation—it may interest our readers to know that experiments on these lines were begun by the Horticultural Expert (Mr. Geo. Quinn) in 1907; and in September,

1908, a series of tests were set out in the Government Experimental Orchard at Blackwood, the main difference in this case being that the trees upon which the experiments are conducted have been propagated in the departmental nursery from trees and stocks whose parentage has been known for a number of years. Thus, if the result of these experiments is somewhat deferred, compared with those conducted on mature trees, as Mr. McAlpine proposes, it will be more complete and far-reaching. A complete series of manuring tests has also been in operation at Blackwood for three seasons on the lines laid down by Mr. McAlpine, and they comprise a greater variety of manures and combinations of manures than he proposes to experiment with. As regards stocks, a very comprehensive set of trees has been planted and worked, and last season a few fruits were obtained from some of the first sets, so that before the expiration of the test period of four years, which the general investigation is to occupy, a considerable amount of fruit should be available for examination. In the plots devoted to the experiments with stocks provision has been made for subjecting some of the series to irrigation at different times of the year, while it is intended to cover other trees over so as to prevent their receiving any summer rains, which it is thought might affect the fruit.

Several sets of trees were planted at Blackwood for experiments in pruning. One set has not been pruned at all, and it is proposed to leave these trees unpruned and merely thin out the fruits. Another set will be pruned for the first three years, when pruning will cease in favor of thinning the fruits. In another series the trees will be pruned moderately every year, but the fruits not thinned. In another series after three winter prunings the trees will be pruned each second winter, and in still another they will be pruned every winter as well as summer.

To test the effects of tillage three series of trees have been set out; two plots having been subsoiled before planting, and one merely surface-ploughed. Of the first two, one is receiving two ploughings each winter, with subsequent scarifyings to retain the moisture. The other is only in receipt of one ploughing, with the same summer tillage. The non-subsoiled plot is receiving the same cultivation as the general bulk of the orchard, that is, one or two winter ploughings, as deemed necessary, with subsequent summer tillage.

Of the few fruits obtained last season from the oldest of these stocks some were affected by bitter pit, and it is interesting to know that these trees were not sprayed with any poisonous compound while the fruit was upon them.

DISEASES OF FARM ANIMALS.

BY OFFICERS OF THE STOCK DEPARTMENT.

No. 2.—Causes, Symptoms, and Post Mortems.

(Continued from July, page 1131.)

By far the greater number of diseases which affect farm stock are caused by very small members of the vegetable and animal kingdoms, which are called parasites—a word indicating that they live at another's expense. The vegetable parasites are often called germs or microbes, and produce the most destructive diseases—tuberculosis, swine fever, &c. Examples of animal parasites are lice, ticks, worms, &c.

As a rule an animal which has been affected with a disease caused by germs and recovers is exempt from another attack, but this does not always hold good. Some of the diseases caused by microbes are infectious or contagious, *i.e.*, are catching from one animal to another, either by inhalation, ingestion, or by inoculation.

Careless attention to a wound, especially if the animal is kept in insanitary conditions, may lead to the introduction of germs lurking in soils. Tetanus (lockjaw) is produced in this manner.

In connection with germ diseases locality and class of country play an important part, and outbreaks of disease may occur in one farm whilst the neighboring farm remains immune; peculiarities of the soil may lead to the harboring also of parasites, *e.g.*, flukes, &c.

In dealing with the causation of disease, predisposition is a very important factor. Amongst the many predisposing causes may be mentioned temperament, debility from starvation, excessive secretion, or excessive sexual indulgence. The age and sex of the animal must also be taken into consideration.

Some diseases, especially colds, fevers, &c., are caused by bad air or by germs floating in it. Good ventilation and plenty of sunlight are essential; stables imperfectly lit are liable to be kept dirty.

Good food properly administered never produces disease, but irregular dieting may have serious effects, such as colic and diarrhoea. Bad food, mouldy or contaminated chaff, hay, ensilage, or bran, cause stomach and intestinal troubles; and that serious disease, cerebro-spinal meningitis, has also been attributed to the ingestion of bad food. The "swill" barrel is also a means of causing gastric troubles in swine. Direct poisoning may also

result from the presence of poisonous weeds in pastures and crops. Lack of cleanliness is a very common predisposing and exciting cause of many diseases—predisposing to the introduction of germs, and exciting, as in greasy heels in horses, and skin affections in all animals.

Work—too much of it or too long—will cause diseases of the lungs and heart, while want of it will predispose to colic, founder, and weedy leg. The irregular watering of animals is a very frequent source of trouble. Water may also be chemically impure and cause poisoning, as when it is loaded with salt, or it may act as a carrier of germs, which is well illustrated by the outbreaks of anthrax which follow the course of a stream.

Injuries may produce diseases, *e.g.*, quittor and fistulous withers. In seeking for the cause of a disease it is necessary to consider the animal itself, and note any peculiarity it has; breed, conformation, organisation, color, may all tend to predisposition, so carefully inspect the surroundings, air, water, food, soil, housing, &c., and see if any of them are at fault as contributory causes.

The diagnosing of any serious ailment or disease should be left to the qualified man, who will, when possible, utilise the microscope or other laboratory means to find out the actual cause, parasite, or poisonous agent.

SYMPTOMS OF DISEASE.

Not only are the causes of disease numerous and varied, but the symptoms or signs by which it shows itself are equally so, and natural ability, careful training, and long experience are required to enable one to rightly judge of their relative importance, and to carefully consider their value as indications of the severity or extent of disease; but there are a few broad lines which anyone connected with stock may follow, and render much help to the veterinary surgeon who may have to investigate, and by early appreciation of the onset of disease may often check it and prevent its becoming serious.

It is very necessary to have a keen eye for the habits of individual animals in health, so that some slight alteration will call attention to them, and probably lead to the detection of disease before it has got too firm a hold.

The position and attitude of the animal are of great importance, *e.g.*, in the horse, the stiff standing position taken in cases of tetanus, and in cattle the recumbent state, with head turned to one side, in milk fever.

As a rule the early onset of disease may be noticed in a general falling-off from robust health; the dung or water will show some alteration, the breathing will not be just as usual, the coat will lose its natural gloss and stare, the appetite may fail, the animal may be quiet or very restless, and there are numerous other signs.

In cattle we get dryness of the muzzle, chewing of the cud suspended, and the milk supply is stopped or is lessened in quantity. As a rule, if the breathing organs are attacked, the character of the breathing is altered. If

an animal is breathing with difficulty when at rest it is evident there is something wrong. Breathing may not be the same on one side as the other; there may be cough, evidence of sore throat, feverishness, or disinclination to lie down. The signs of trouble in the digestive organs vary from the general unthriftiness of indigestion to the sharp agonising pain of colic, or from obstinate constipation to profuse diarrhoea.

When the kidneys and other organs which remove waste from the blood are wrong there are changes in the nature of the water in color, consistency, and quantity, and sometimes swellings of a pitting character about the legs and under the chest and belly.

When worms are the cause of the trouble careful search in the dung will reveal them, while if parasites are affecting the skin they may generally be found either by the naked eye or a hand lens, and the itchiness and falling off of the hair (in sheep looseness and ragged appearance of the wool) will indicate their presence.

Blood diseases due to poor blood, or arising from some alteration in the blood, are shown by weakness, wasting, and early fatigue.

In nearly all diseases caused by germs there is fever, dulness, redness of eyes and nostrils, and increased rate of breathing.

Swellings and enlargements always indicate a departure from the natural condition, and hardness of a part may show disease, as in inflammation of the udder in cows or sheep.

The temperature of an animal, the condition of the pulse and visible membranes all assist materially in finding out what is the matter with it, but to be familiar with the conditions of illness requires special training and knowledge.

MEDICINES.

The different forms in which medicine may be given by the mouth include drenches, balls, powders, and electuaries.

The Drench or Draught.—Fluids are administered in this manner, and require to be carefully given. A strong glass bottle is commonly used for the purpose, and if carefully handled there is not much danger of breaking. A special drenching bit is obtainable, and in using this care must be taken not to give more medicine than the animal can swallow at a time. Swallowing may be induced by tickling the roof of the mouth, but the tongue must be left free. The head should not be held too high, and if the animal coughs it should be lowered immediately.

In drenching horses the head may be raised by placing the loop of a twitch in the mouth as a support, or by making a loop in a rope to go under the nose-band of the halter and into the mouth and passing the end over a beam or other convenient object. Under no circumstances should medicine be poured down the nostril, owing to the danger of some of the fluid going down the windpipe and causing mechanical pneumonia. For the same reason it

is dangerous to pour water down the nostril, as is sometimes done when the animal refuses to swallow.

Cattle seldom receive medicine in any other form than the drench, owing to the fact that solids pass directly into the paunch and produce little or no effect. In drenching cattle the same restraint is not necessary as when drenching horses. Cows may be drenched in the bail or yard. The head should not be held too high, and the drench should be administered slowly.

Drenches are given to pigs by passing a loop in a cord over the snout behind the tusks and hauling the animal up to a post. The favorite means of giving medicine to pigs, however, is by means of an old boot with the toe cut out.

Balls.—These are chiefly given to horses, and used to be the favorite method of giving medicine. They are now seldom used, owing to the difficulty in administering, but are useful when nauseous substances such as aloes have to be given. In making a ball the ingredients are mixed into a stiff paste with a suitable mass, such as treacle or honey, and enclosed in a paper wrapper or gelatine capsule. To give a ball the horse should have a halter on and be backed in a stall. The tongue is held by the left hand in such a manner that the mouth is kept open, the ball is held between the first three fingers of the right hand, which is brought together as much as possible, and passed rapidly along the roof of the mouth over the root of the tongue, which is immediately released; stand at the side and not straight in front of the horse and give the ball quietly and quickly. After giving the ball watch the left side of the neck to see if it is swallowed; if not, give a mouthful of water.

Powders.—These are a most convenient means of giving medicines to all animals, and are usually given in the feed, for which reason they should not contain substances having a disagreeable taste. The feed should be slightly damped and the powder thoroughly mixed with it, so as to ensure the patient receiving it. Soluble substances with little or no taste are readily taken in the drinking water. Powders of small bulk may be placed directly on the tongue.

Electuaries.—A convenient form of administering medicine when a local effect is desired on the mouth or throat, or when for any reason it is dangerous to give medicine in other ways. Electuaries are prepared as a thin paste and are placed on the tongue and molar teeth with a flat piece of stick. They become dissolved in the mouth and are slowly swallowed.

“ POST-MORTEM ” EXAMINATIONS.

It is necessary for stockowners to have some idea of holding a *post-mortem* examination, owing to the fact that the services of a qualified veterinary surgeon are often difficult to obtain; the distances are often so great that by the time he arrives the carcass is not in a fit state for examination. In a

great many cases inquiries made as to the cause of the death of an animal elicit no information upon which to form an opinion, a perfectly normal condition being often described.

Reports of disease in stock should give a description of the symptoms, noting any departure from the normal, and also state the length of time the animal has been sick, whether any others are affected, and the numbers affected or dead.

The material required for a *post-mortem* are two short butcher's knives, a steel, a meat saw, a bucket of water and one of disinfectant, such as lysol or carbolic acid, in which the hands should be frequently rinsed.

It is usual to skin the animal, but in this connection it should not be forgotten that some diseases of animals, such as anthrax, are communicable to man, and should an animal die suddenly or be found dead, and have discharge of dark-colored blood from the nostrils, mouth, eyes, anus, &c., anthrax may be suspected, and the carcass should not be opened, but the case should be reported to the nearest inspector of stock.

Before proceeding to open the animal a note should be taken of the external appearance, if in fat or poor condition, length of time dead, examine external openings for discharges. It is not intended in these notes to describe the diseased conditions which may be met with, but only to name those most commonly found.

The officers of the Stock Department will examine any specimens sent. The best method of forwarding portions of organs, &c., is to wrap them up in a piece of cloth soaked in a 4 per cent. solution of formalin and placed in a tin canister or other suitable receptacle, or in a bottle with 4 per cent. formalin. If formalin is not obtainable, use methylated spirits.

THE HORSE.

The carcass is best opened while lying on its side. After skinning, remove both fore and hind limbs on the upper side. The foreleg is removed by cutting the muscles attaching it to the side of the chest, lifting the leg and cutting from point of shoulder towards elbow. The hind limb is removed by cutting through the hip joint. The ribs are now sawn through close to the breast-bone, and also close to the backbone, and the cuts are continued backwards, towards the point of the hip, so as to remove the whole side of the chest and the belly and expose the contents of both these cavities. Care should be taken not to cut or injure any of the organs. Before interfering with the organs they should be viewed in position to see if anything abnormal exists, as, for instance, a twist of the bowel or rupture of the stomach or bowel.

The abdominal organs are examined first, starting with the intestines. Ligature the first part of the small bowel, just behind stomach, and also the anus, after which remove the whole intestine from the body and examine

portions separately, note quantity and quality of contents, open from end to end and examine lining membrane for parasites; wash in water and examine for inflammation, ulceration, &c.

The parasites most common in the intestines of the horse, and which are likely to be met with, are *Ascaris megaloccephala*, the common round worm; *Oxyuris curvula*, the whip worm; *Strongylus armatus*, the armed strongyle; *Strongylus tetracanthus*, the palisade worm; *Tænia perfoliata*, the tape-worm. Now remove stomach by cutting gullet, just behind the midriff, incise by cutting round greater curvative; note the difference in appearance of right and left sacs. The spiropteral (worm) tumours are often found in right sac of this organ. They vary in size from a marble to a hen's egg. Bots are found attached round the outlet (pylorus) of the stomach. These parasites are very common and are only exceptionally the cause of death.

Spleen.—This organ is attached to the stomach. It is reddish-grey in color and sickle-shaped.

Liver.—Normally of a reddish-brown color, it may be altered in texture (cirrhosis), or in color (purplish-brown in congestion). In some diseases of this organ the tissues are tinged yellow.

Kidneys.—Remove and cut open, look for calculi (stone), pus, &c. See if capsule strips are present.

Bladder, &c.—Note quantity or absence of urine, look for calculi. Death sometimes results from rupture of this organ. Note color of urine, &c. The genital organs of the female require careful examination where death has taken place shortly after foaling. Look for injurious lacerations, &c., and note condition of internal surfaces.

Lungs.—Note the appearance of the lining membrane of the walls, also the surface of lungs, whether any fluid is present, and if the lungs are attached to sides of chest. Normal lung is uniformly soft and springy, and floats in water. It will often be found that the lung upon the side which the animal lay when it died is much darker in color. This is a mechanical congestion due to the blood gravitating to the lowest portions of the body. In pneumonia portions of the lungs are solid and liver-like, and vary in color from red to grey. Other organs, such as the brain and spinal cord, are not usually examined.

CATTLE AND SHEEP.

Remove side of chest and abdomen as described for horse; note organs in position. Remove stomach, first ligaturing gullet and commencement of small intestines, open stomachs, examine separately, particularly for foreign bodies, which, when present, are commonly found in the second stomach (honeycomb). The third stomach (the bible) is normally fairly firm and dry. This condition must not be taken for "dry bible."

Perforation of the stomach and death from peritonitis sometimes takes place from the presence of foreign bodies, which may also cause an obstruction

between the third and fourth stomachs, and may penetrate forward and pierce the lungs and heart. In other organs proceed as described for horse.

In cattle special note should be made of any cheesy appearance of the lungs, glands between the lungs and liver, glands in caul fat, and grape-like adhesions in membranes covering lungs inside of ribs and midriff (the division between chest and belly); these indicate tubercular disease.

In sheep watch for signs of worm infestation in the bronchial tubes, lungs, and fourth stomach, and for flukes in the liver.

In making a *post mortem* of a pig direct attention to the condition of the skin, especially between thighs, behind ears, and between forelegs. Make a circular incision round the belly, lift the tissues to one side, thus exposing the contents.

In young pigs the chest may be opened in the middle line with a knife, in old pigs with a saw. The navel should be examined for signs of matter or pus—an evidence of infection at time of birth—and examine chest organs for pneumonia and pleurisy, and the cavity between the covering of the heart and the heart itself for fluid.

Blind gut and large bowel should be emptied of contents, cleansed, and inspected for signs of inflammation and ulceration. Stomach to be incised and examined for inflammation and ulceration.

Liver, kidneys, and other organs should be carefully noted for any departure from health. In pigs particular attention should be given to the glands in the throat, between the lungs, and the covering of the bowels for evidence of tuberculosis. In pigs the disease shows itself in creamy white, cheesy, and limey appearances.

Any worms or other parasites met with should be noted and, if possible, preserved for special examination.

(To be continued.)



ASSISTED IMMIGRATION.

HELPERS FOR FARM AND STATION.

A great deal of uncertainty exists, especially in the country districts, as to the method by which assisted immigrants can be brought to South Australia. The underlying idea is that there shall be no indiscriminate immigration, but that the new arrival shall have friends to go to or else someone who has applied for his or her services and paid part of the passage money. There are three systems by which immigrants may be introduced into the State, but in all cases the immigrant, before embarking, must satisfy the State Emigration Agent in London as to his or her eligibility.

NOMINATION BY FRIENDS.

Any natural born or naturalised subject of His Majesty resident in this State may nominate any person for an assisted passage to South Australia in the form of a schedule to be obtained at the Crown Lands and Immigration Office. Nominations for assisted passages are accepted only in respect of persons who come under one or more of the following three classes, and who are under 50 years of age, viz. :—

- (a) Those who are closely related to the nominator.
- (b) Those who are agricultural or rural workers, and their families.
- (c) Those whose occupations are such that no congestion in any occupation or trade will be caused by their coming to this State.

The amount that shall be required from the nominator towards the passage of each person nominated shall be as follows :—

In the case of a person—

- (a) Under 12 years of age £3
- (b) Twelve and under 40 years of age £4
- (c) Forty and under 50 years of age £8

The payment of the amounts mentioned will entitle the nominees to accommodation in open berths only, but persons desirous of giving their friends more comfort on the voyage may secure passages in four-berth or two-berth cabins on payment of additional amounts of £2 or £3 respectively.

In the administration of the regulations persons closely related to the nominators will be taken to mean parents, brothers, sisters, husbands, wives, or children of the nominators. In approved cases the nomination of parents of nominators or nominees over 50 years of age—otherwise ineligible under the regulations—will be accepted on payment of the full contract rate of

passage money charged by the shipping companies. In all cases other than those of relations or agricultural or rural workers the occupations of the nominees will be carefully considered before a certificate for an assisted passage is issued, to make certain that there is a shortage of labor in the particular trade or occupation followed by the proposed immigrant. If any person by any false statement obtains for himself or any other person an assisted passage he will be liable to pay the whole cost of the passage and a penalty of not more than £50. Nominators must, therefore, be careful to give correct information as to age, occupation, and other particulars required.

The nomination forms contain a guarantee by the nominator that accommodation and employment will be awaiting his nominee, or that adequate provision will be made for the nominee's maintenance on arrival in this State.

On the expiration of 12 months from the date of arrival of the nominee the nominator will be required to sign a declaration that the person nominated is then residing in the State, failing which he will be required to pay the Commissioner of Crown Lands the balance of the passage money. This declaration will not have to be made by farmers who apply for agricultural laborers.

Up to date 950 persons have been nominated by friends in South Australia, 87 of the nominees being agricultural laborers and 89 domestic servants. The system was only put in operation last April, and so far 25 immigrants have arrived here.

If persons are nominated from any European country outside Great Britain they must pay their own fares to London and present themselves there for approval by the Emigration Agent. Nominees in other parts of the British Empire or in the United States of America will be required to pay the full fare to South Australia, and the amount of the Government contribution will be paid to the nominator if the immigrant, on arrival here, is found to comply with the regulations.

APPLICATIONS FOR AGRICULTURAL LABORERS.

In order to meet the demand for agricultural laborers a system has been inaugurated under which a farmer can pay £4 towards his passage money. The Emigration Agent in London will select a suitable man under 40 years of age and the Government will pay the balance of the passage money. The farmer will have to sign a guarantee to employ the person selected at a weekly wage to be approved by the Commissioner of Crown Lands. The contribution of £4 will cover the fare of the employé from the port of arrival to the farm by rail, steamer, or coach.

It is clear that the farmers of South Australia either do not understand the Government proposal or are for some reason disinclined to take advantage of it, for so far only seven applications have been received.

Neither the employer nor the employé will be asked by the department to sign an undertaking to continue the engagement for any specified time ; this will be a matter of arrangement between the two parties. Great care will, however, be exercised by the Emigration Agent in England when selecting agricultural laborers, and it is hoped that there will be very few cases where they and their employers will wish to part company.

DOMESTIC HELPERS.

Arrangements have also been made for sending out female domestic helpers under 40 years of age, who will each be required to pay £4 towards the passage money. As far as possible girls will be drawn from the rural districts, and the Emigration Agent is being assisted in the selection by a lady superintendent from South Australia. So far 305 applications for domestic assistants have been received, and the first batch will leave England in September. The applicants are not required to pay any part of the passage-money.

ANOTHER PROPOSAL.—TIME-EXPIRED SOLDIERS.

The Government has under consideration a scheme laid before it by the Rev. John Nelson, who for 20 years has been an officiating chaplain in India, with regard to the introduction to South Australia of time-expired British soldiers under the age of 30 years. It is also proposed to assist in the emigration from India of youths of 18 years of age from the Lawrence Military Orphan Homes.

Mr. Nelson seeks, at the instance of the soldiers, and with the approval of the Indian army authorities, to find employment for the men on farms and stations in South Australia. After having served eight years with the colors the soldiers are placed on the Reserve, and from 8,000 to 10,000 are sent back to England from October to March every year. The soldiers are described as being men of excellent character, physique, and ability, and those to be selected must possess first-class certificates, and will be drawn largely from the Horse Artillery and Cavalry Regiments. Many of them are the sons of farmers in England, Scotland, Ireland, and Wales, and are used to the management of horses, and have a general knowledge of farm work ; numbers of them are also certificated army cooks. The soldiers themselves are willing to pay £4 towards their passages, and farmers will be asked to pay the expenses by rail, coach, or boat from Port Adelaide or the Outer Harbor to the farms. It is desired, however, by the authorities in India, that the men shall be offered permanent employment at a minimum wage of at least £1 per week (with board and lodging). Some of the men are married, and with their wives would be available for employment as married couples.

The youths in the Lawrence Military Orphan Homes are the children of British soldiers who have died in India. Mr. Nelson states that they have

been specially trained in the Homes, and would be suitable for employment on farms or stations. The authorities of the Homes will not allow the youths to leave India unless they are guaranteed 12 months' employment at a wage of not less than 15s. per week (with board and lodging). They are not in a position to pay the sum of £4 towards their passages, and applicants will, therefore, be asked to pay that amount as well as the railway, steamer, or coach fares from Port Adelaide or the Outer Harbor to the farms. Mr. Nelson states that the youths will be prepared to refund by instalments from their wages the amounts paid towards their passages by the farmers. The men and youths will be carried at half rates on the railways, and at reduced rates on steamers.

If the proposal is adopted, the Government will be prepared to grant assisted passages to this State, and will send Mr. Nelson to India to select the most suitable men and youths available, and to bring out a contingent to arrive in November next.



TETANUS (LOCKJAW) IN SHEEP AND LAMBS.

BY AN OFFICER OF THE STOCK DEPARTMENT.

Year after year reports reach the officers of the Stock Department regarding the mortality amongst lambs within a few days of their being marked (tailed and castrated), and investigations prove invariably that tetanus is the cause. On some farms up to 12 per cent., principally male lambs, have died of this disease, and from 2 per cent. to 4 per cent. has been a common death rate.

The annual monetary loss to the State is probably between £15,000 and £20,000. It has long been noticed that the mortality is greater on farms in the older settled districts than on large runs in the outside country and the drier areas. The sheepowner will at once ask why this is so. The answer is that all farmyard manure and the soil over which it is spread are teeming with millions of spores of the micro-organism which sets up the disease in animals.

Before being marked the lambs, when lying about the manured pastures, get the scrotum (purse) and tail contaminated with the spores. When the incisions are made by the knife infection may occur, or as the wounds heal infection may take place as the lips of the openings draw inwards. As the scab forms, and the air is shut out from the deeper parts, the conditions are favorable for the growth of the tetanus bacillus. This is, no doubt, the most common source of infection, but there is another way in which it may occur. After the operation lambs are dropped into yards where there is either decayed manure dust or mud contaminated by manure. The lips of the wound become infected with the germ-laden matter, and infection follows. There is no practical cure when the disease occurs in lambs.

PREVENTIVE MEASURES.

In their reports to the department owners have asked how to prevent the disease. Several years ago the following was advised:—Stockholm tar, 9 parts; coal tar, 1 part; mix thoroughly, and smear the tail wound and what remains of the tail. After removing the testicles, fill the opening with a 3 per cent. solution composed of glycerine and water (equal parts), turpentine, and pure carbolic acid. Have this mixture made up by a chemist. As the lambs are being marked have the ingredients handy, and as soon as the operation is over let a boy apply them; about $\frac{1}{2}$ oz. of the solution to be put into the purse, which should then be smeared over with the tar mixture.

Letters to hand from those who have followed the advice of officers of the department speak highly of the preventive treatment, no mortality having occurred where previously there were many deaths. One writer says—“The use of the mixture makes little difference in the time taken over the operation, all that is required being a little handiness. Since using the mixture we have not lost a single lamb.”

TETANUS IN ADULT SHEEP.

Reports show that this disease has caused heavy mortality amongst adult sheep, one owner losing 300 animals shortly after last shearing. They all went stiff in the limbs and jaws. These cases were caused by the shear cuts becoming infected with the spores of the tetanus bacillus, which the sheep were carrying in the dust and grease on their limbs and bodies, or which were picked up by the moist wounds from decayed manure dust in the pens and yards.

To prevent this fatal disease all shear cuts should be well dressed with the tar mixture advised for the tail wounds on lambs. A thick adhesive antiseptic mixture will be found the most satisfactory for open and fresh wounds. Do not forget that tetanus can be prevented, but not cured.

THE CULTURE OF MANGELS AND TURNIPS.

By W. J. COLEBATCH, B.Sc. (Agric.), M.R.C.V.S., Superintendent
of Agriculture in the South-East.

(Continued from page 1169.)

The After-cultivation of the Mangel.—When the seed has gone in satisfactorily and the weather has been favorable, the first pair of long narrow leaves may be expected to appear above ground about 10 or 12 days after sowing. If the seed has been too deeply covered, or if the weather and soil conditions since seeding have led to the formation of a tight surface crust, the young plants may fail to come through evenly, and a second seeding may have to be resorted to. In order to give the seedlings every encouragement to develop rapidly into sturdy young plants it is well to start the cultivators as soon as the rows can be readily seen. This will usually be about three weeks after drilling. The first cultivation should not be deep, but the implement ought to be run as close as possible to the plants without injuring or burying them. By working close to the rows any crust that may have formed will be broken up, and most of the weeds that are likely to do harm at this critical stage will be destroyed. Special shields are often attached to the cultivators to obstruct the soil that would otherwise be thrown over the struggling seedlings. A further benefit which this early horse-hoeing confers is the encouraging of a wider root system, an important consideration with a crop that feeds so voraciously as the mangel.

When the second pair of leaves has appeared the operations of bunching and thinning should be started. Sometimes the rate of growth is so rapid that the hand hoes are required almost before the cultivator is out of the field, but generally a few days elapse between horse-hoeing and the arrival of the plants at the "four-leaf" stage. The chief point to bear in mind when thinning out a mangel crop is that medium-sized roots are to be preferred to large ones. The smaller bulbs—7lbs. to 8lbs. weight—are of better quality, contain less water, and are more economical to feed. Very wide "singling" favors the growth of large individual plants and a heavy yield per acre, as revealed by the scales; but chemical analysis has demonstrated that these

exceptionally high returns of gross produce are obtained at a sacrifice of total nutrients. On the other hand, it does not pay to neglect the process of thinning, or even to unduly delay it, as a few days of overcrowding will be followed by rank spindly growth, which either dies off altogether or else ripens ultimately into stunted, misshapen roots of inferior feeding value. In some parts of England the method of "bunching" was only resorted to when the plants made such rapid growth that a more expeditious system than "singling" was needed to prevent over-weakening. To the farmer of to-day, however, the "bunching" method, which consists in hoeing out the rows into clumps 8in. to 12in. apart, will appeal strongly as a means of cheapening the cost of production. These bunches are subsequently thinned to a single plant by hand labor, and the blanks are filled up by dibbling in plants taken from more favored parts. For globe-shaped varieties from 10in. to 12in. should be left between the plants, and for long types 8in. to 10in. When transplanting to fill up spaces care must be taken to avoid doubling and injuring the root. In mangel-growing districts cabbages, kohlrabi, or turnips are often used for filling up the broken rows instead of mangels, as they are less delicate as seedlings, and, where the practice of feeding-off mangel leaves obtains, they counteract to some extent the ill effects of the wüurzels. Kohlrabi is particularly suitable for the purpose, as it matures at the same time as the mangel and can be harvested with it. It is well to choose a dull, overcast, or even a showery day for thinning and transplanting.

If the crop has not made a good start and appears to be "hanging fire," it may be stimulated by the application of a part at least of the mixture of nitrate of soda and common salt reserved as a top dressing. This should be broadcasted when the dew is off the leaves, or the nitrate may scorch the young tissues.

Careful and systematic horse-hoeing throughout the summer will be sufficient to keep down weeds and maintain a fine soil mulch. As a rule it is necessary to work through the rows once every two or three weeks, and as soon as practicable after each fall of rain. At the end of the summer the rows will be too close to permit of further intercultivation, and in dry districts they should then be moulded up to ensure continued growth. The part of the bulb appearing above ground is held to be slightly less nutritious than the buried portion.

Harvesting Mangels.—It has already been pointed out that in some localities harvest may begin before the roots have matured. The mangel leaves are sometimes fed off by broken-mouthed or "gummy" sheep, with the idea of making the best use of the tops without injuring the bulbs. This practice is akin to the old Scotch system of "blading" cabbages and is just as erroneous in principle. The earlier the leaves—from which are derived the food elements stored in the roots—be fed off the greater must be the damage. It is conceivable

that in the case of a crop which has bolted into over-luxuriant leafage the thinning-out of the tops might do good by letting in the sunlight. The beneficial effect, however, of judicious treatment in special cases cannot be accepted in support of the regular practice of grazing off the tops during the active growing stages, or even immediately prior to the harvesting of the roots. Apart from that fact that "as long as the mangold leaf is in a fit state to be useful as food for cattle, so long is it important to the well-being of the plant itself," there is the injury done through irregular feeding down of the tops and by wounding of the bulbs themselves. On the whole, then, the practice of stripping or grazing before the root harvest is to be condemned in favor of one that provides for the cleaning up of the discarded tops and remnants of roots after the main harvest has been completed.

Mangels cannot be lifted and stored with safety during frosty weather, so that the aim should be to get the roots into the clamp before the severity of the autumn begins to be felt. In the mangel-growing districts of this State the month of May or the early part of June will be most suitable time for the work. By delaying the harvest still further very little extra growth will be obtained, but in many parts the land may become so wet and boggy that it will be found impossible to recover the roots till August or September. At any time the tracking of the drays through the mangel field during the process of harvesting does damage to the mechanical condition of the soil, and it is consequently unwise to defer the lifting of the roots till the rainy season for the sake of a slight increase in the total yield. Furthermore, mangels do not keep so well if allowed to get too ripe before being put into pits. In some seasons mangels hardly seem to stop growing in the autumn; in fact, if the winter be a mild one the tops may remain green until replaced by the new burst of growth in the following spring. Generally speaking, however, the leaves begin to droop, wither up, and turn yellow on the approach of autumn, and the roots are then ripe enough for lifting. Unlike swedes and turnips, mangels cannot be economically fed *in situ*. In the first place, they are not in the best condition for feeding till they have mellowed in the clamps; they exhibit a marked tendency to "bleed" when wounded, and the sugary sap continues to escape through the broken surface, which shows little or no inclination to dry up and heal. The moulds and decomposing bacteria quickly get a footing in these running sores, and the roots rapidly decay away. Frosts also affect an injured mangel much more readily than a sound one and hasten the process of dissolution. Over and above these objections there is the practical difficulty of getting the roots fed off without waste. Even when the spring tooth cultivator is run over the field to loosen the shells there is considerable loss of feeding value, more especially when the long varieties of roots are grown.

The roots must be carefully lifted and handled, as every wound is a source of danger from fermentation in the pit. For the same reason mangels should

never be ploughed out; this leads to the breaking of the tap root. Trustworthy men can do good work with forks for lifting and knives for topping, but as a rule the hands only should be relied on for the pulling up of the roots and the twisting off of the leaves. The pullers usually work in pairs, each one taking two rows. The lifting of the roots and the twisting off of the tops is one continuous action and a little practice is required to get into the knack of it. The roots are dropped outside the rows from which they are lifted, and the tops between the rows. Where a knife is used to cut the tops a neck at least $\frac{1}{2}$ in. long should be left to prevent excessive bleeding. On no account should the roots and root fibres be trimmed; it is better to cart and store them with the soil adhering than to wound them with a knife. When long mangels have been grown on stiff land up to 13 tons of clay per acre have been known to be stored with the roots.

The storage of the mangels is more important than that of any other root crop. They are generally the earliest roots clamped and the last to be fed to stock, and they are less resistant to cold and decay than either turnips or swedes. The roots are best stored in long prismatic heaps measuring from 7ft. to 12ft. wide on the ground, and 4ft. to 6ft. high from base to apex. The pit may be located in the mangel paddock if a dry, sheltered spot can be found among the headlands, or else the roots can be carted to the steading and clamped in a shed or under the protection of a good hedge or plantation. The floor of the pit should be covered with a thick layer of straw, and as each dray unloads the badly bruised roots should be put on one side to be fed to the pigs and the rest heaped up to continue the prism. The sides are next covered with 8in. or 9in. of short straw or cocky chaff, and this again is kept in position by a coating of soil some 5in. or 6in. deep. The apex is left open to allow the water vapor and respiratory gases to escape freely. In the case of very long clamps it is advisable to insert straw chimneys at intervals to avoid overheating. A drainage trench is needed round the base, and in exposed situations the sides are often thatched with straw. If frosts occur during pitting the work must be stopped till they are over, as roots stored while frozen decay rapidly in the heap. In the spring, when the danger from frosts is past, the earth covering may be removed in order to check the roots from sprouting into fresh leaf. When sufficient room is available at the steading, mangels can be stored equally well under cover. The floor and walls of the root barn should first be covered with straw to protect the bulbs from frost, and the top of the heap should receive a similar coating. In this way mangels have been well stored in heaps measuring up to 12ft. high and over 5yds. in width. As long as the barn is cool and well ventilated there is very little risk of overheating in cold climates, but under South Australian climatic conditions it is hardly likely that roots will be found to stand prolonged storage, either in pit or shed, as satisfactorily as they do in Great Britain.

There they remain in the clamps from October till June or even August, and are relied upon to supply a good proportion of the spring and early summer feed. They come in after the yellow turnips and swedes are over, and before the meadows have made much headway. In this State, however, the spring is so warm and the summer so early that it will be during the winter months that the mangels will be turned to best account. Hay, oaten straw, and silage can be held to carry stock through a dry summer, but for winter feed mangels can scarcely be surpassed.

Composition Before and After Storage. — It is an axiom amongst English farmers that mangels fed before Christmas induce scouring, whereas if not used until after the new year they lose these injurious properties. It may be that mangels that have not "sweated" and matured in the pit or heap contain some substance, possibly a nitrate or an oxalate, which has a laxative effect on stock. The fact that at harvest the roots contain large amounts of nitrates and that these diminish as spring approaches may have an important bearing on the question. It has been said that the red roots are more liable to purge than the yellows, and as a rule the latter are fed first on this account, but the notion is probably an erroneous one. If we may judge by the experiments carried out at Woburn during the years 1899 and 1900, the explanation may be that mangels, like all roots and tubers, are very watery, and when fed in large quantities tend to weaken the walls of the alimentary canal and cause relaxation in animals that have not been having roots for a considerable time at least. In November and December (Great Britain) stock have not yet adapted themselves to the winter dietary and are more easily affected, whereas in March they have had a share of the turnips and swedes and are quite capable of dealing with stored mangels (which have lost some of their water meanwhile) without suffering any loss of tone in their digestive organs. Even pitted roots, if fed in excess without the addition of some form of dry fodder, will induce scouring in sheep and cattle. In the warm weather mangels are sometimes very useful as a corrective to liver ailments on account of their cooling and aperient effects. Dr. Voelcker concluded from his experiments on "The Early Feeding of Mangels to Stock," that—

1. Well-ripened mangels, given in moderate quantities, say 28lbs. to 30lbs. per head daily, can be quite well fed to fattening bullocks in the early stages in the place of swedes, if along with them be given either cotton cake, bean meal, or abundance of long hay.
2. As soon as the quantity of mangels reaches 35lbs. to 40lbs. per head daily scouring may start.
3. When this is the case, hay will not check it, but bean meal or cake will.
4. Bullocks must be gradually brought on to a full mangel ration and not fed too heavily at the start.

The following table of analyses shows the relative values of small, medium, and large mangels, and includes other farm root crops for purposes of comparison :—

TABLE III.—*Showing Percentage Composition of Root Crops in Terms of Proximate Principles.*

	Dry Matter.					
	Water.	Protein.	Fat.	Sol. Carbo- hydrate.	Fibre.	Ash.
	%	%	%	%	%	%
Mangel, large	89.50	1.30	0.10	6.70	1.00	1.40
" medium	88.00	1.40	0.20	8.51	1.13	0.76
" small	87.00	1.00	0.10	10.20	0.80	0.90
Sugar beet	83.50	1.30	0.12	12.80	1.24	1.04
Turnip, white	92.00	1.08	0.15	5.21	0.96	0.60
" yellow	90.56	1.40	0.20	5.80	1.04	1.00
" swede	89.80	1.40	0.20	7.20	1.10	0.80
Carrot	87.50	1.20	0.20	8.97	1.10	1.03
Parsnip	85.00	1.36	0.34	10.90	1.40	1.00
Potato	75.55	2.06	0.75	18.54	2.10	0.99

With the exception of turnips, mangels are the most watery of all the root crops, the percentage of dry matter ranging from about 10.5 per cent. in the white-fleshed globes to 13 per cent. in the tankards and long reds. It is worthy of notice that in the case of roots containing 90 per cent. of water a difference of only 1 per cent. means actually 10 per cent. more dry matter, so that roots yielding only 87 per cent. of water contain over 25 per cent. more dry matter in a given weight. The amount of water is seen to be highest in the large bulbs, and it is generally found to increase in damp, wet seasons and in the presence of an excess of nitrogenous manure. Any form of manuring which makes for the development of rapid, immature growth favors the production of large, watery roots. In reference to the water content of mangels Hall has stated that " mangels weighing approximately 2lbs. apiece contain about 2 per cent. more dry matter than mangels averaging 7lbs. apiece, above which weight the falling off in dry matter is not so marked." The point of practical interest in this connection is that it pays best to shape our methods of culture to the production of roots weighing 6lbs. or 7lbs. apiece rather than to strain after huge individual bulbs.

The composition of the dry substance does not vary appreciably during the period of growth. Immature roots may contain slightly more water, and a higher proportion of their nitrogen is present in the form of nitrates or amides. The chief constituent of the water-free material is cane sugar; the extent to which it is present in the different " roots " is shown in Table IV.

TABLE IV.—*Percentage of Cane Sugar in Fresh Roots.*

	%	%	%	%
Mangels	7.5 to 8.5	or 60 to 68	of the total dry matter	
Turnips—Swede ..	6.0 to 7.0	or 55 to 64	"	"
" Yellow ..	4.0 to 5.0	or 44 to 56	"	"
" White ..	3.5 to 4.5	or 44 to 56	"	"

Roughly, then, about two-thirds of the dry matter in mangels is cane sugar. The amount varies a little in the different kinds, being greatest in the globes and tankards and least in the long reds. The fat, fibre, and ash are present in relatively small amounts. Of the nitrogenous materials rather less than half is proteid in nature. Several crude albumins or amides are present, but as the ripening process goes on these are to some extent replaced by proteins. Amides, though not co-equal in dietetic value with pure proteids, are readily dissolved in the digestive juices and pass freely into the circulation. Unfortunately a large amount of the non-proteid nitrogen in mangels is in the form of nitrates, and as such is of no value at all for feeding purposes.

Having now discussed the average composition of the fresh mangel as gathered from the field towards the end of the autumn, we are in a position to follow the changes that occur whilst the roots are lying in the pits. Prior to the publication of Miller's investigations at Rothamsted in 1900 and 1902 the opinion prevailed that the roots actually improved in feeding value, *i.e.*, they developed a higher proportion of digestible nutrients as the result of being stored for several months in the clamps. We now know that this is not what actually takes place. To begin with, the changes that occur before the advent of warm weather are really very slight compared with those that go on through the spring and early summer. The mangels were clamped on the 13th October, and samples were taken and weighed at intervals with the appended results:—

Date of Sampling.	No. of Roots in Sample.	Average Weight.
November 30th, 1900	10 ..	3lbs. 2.9ozs.
May 8th, 1901	10 ..	3lbs. 2.5ozs.
June 30th, 1901	9 ..	2lbs. 15.3ozs.

Miller found that the total loss in weight had increased by July 26th to 14 per cent. of the original weight, and that this loss consisted of 11.5 per cent. water and 2.5 per cent. organic matter. This reduction in the percentage of organic matter, when calculated for each constituent, works out as follows:—

Sugar	21.7 per cent. loss
Pentosans	18.6 " "
Crude fibre	8.7 " "
Total nitrogen	29.5 " "

The heavy losses in sugar and the allied pentosans mostly take place in the spring and summer as the result of increased rate of respiration. The roots of course respire all the time they are in the pits, but with the approach of growing weather the cells become more active, and consequently more oxygen is needed to support the increased rate of combustion. In addition to the loss that takes place through respiration a large proportion of the cane sugar is changed during storage into the inferior reducing sugars. Speaking generally the loss in organic matter is mainly to be accounted for by the reduction in the amount of sugar. In the 1899 tests Miller discovered that roots that have been manured with dung and minerals suffered a loss of 14 per cent. of the sugar, or 5.2 cwts. per acre, whilst mangels that received in addition nitrate of soda lost 19 per cent. or 9.6 cwts. per acre. No doubt the extent of the total losses, and in particular those affected by the respiratory processes, is governed in large measure by the temperature, the depth of the protection from frosts, and the provision of means for adequate ventilation.

The loss in nitrogenous substances is wholly confined to the non-proteid constituents, and for the most part occurs during the first two or three months. A proportion of the nitrates disappears at first and some of the amides are replaced by albumins. Towards the close of the storage period, when the bulbs are preparing to sprout, the process is reversed and some of the true proteids are degraded into amides again.

The conclusions drawn by Miller after two years work were as follows :—

“ 1. Apart from the loss of nitrates which takes place during the first two months of storage it is difficult, in view of the small amount of crude fibre and the still smaller amount of indigestible proteids which mangels contain, to see in what way the roots can undergo any material improvement when stored.

“ 2. On the other hand, it is evident that the roots may, and probably do, lose a very appreciable amount of their most important constituent—sugar. As far as the experiments go there is no evidence of any actual increase of digestible proteids, whilst a loss is shown to be at any rate possible.

“ 3. The convenience of having mangels for feeding up to the early summer months probably compensates for the losses which may be assumed to occur under ordinary conditions; but there seem to be good reasons for doubting the advisability of prolonging the storage, especially when the extra trouble involved in order to prevent rotting is taken into account.”

Summed up, then, the position appears to be that, although the farmer loses a varying amount of food materials by chemical changes in the clamps, and although this loss may amount to nearly one-third of the original quantity of dry matter if storage be protracted, yet these disadvantages are more than compensated for by the enhanced value of the roots at a time of year when succulent fodder is scarce. The total amount of loss is obscured by the degree of concentration due to loss of moisture.

Utilisation.—Mangels may be fed profitably to all kinds of farm animals. Like most root crops they appear to possess even higher nutritive qualities than chemistry would credit them with. They contain very little actual food material, but they present it to stock in a succulent and highly digestible form. As Professor Wrightson states, "one of the strongest points of excellence in mangel-wurzel is its keeping properties." It can be held over till required and the time of feeding altered to suit the seasonal variations. Occasionally, the crop is allowed to lie in the field through the winter and grazed off in the spring, but the practice is a wasteful one, and should be avoided.

For calves, growing cattle, fattening bullocks, or milking cows mangels form an excellent food. From 20lbs. to 40lbs. a day fed with hay or well-saved straw, make a good basal ration for the winter, and in colder climates the mangels may be fed twice as heavily with good results. They impart no flavor to the milk, and are therefore much prized on dairy farms as a safe means of keeping up the milk supply during the cold weather. Mangel-cutters that can be attached to the back of a dray and worked from the axle are procurable and simplify the feeding question a very great deal. Mangels are better cut for cattle, horses, and sheep, though they may be fed whole to pigs. A few pounds a day sliced and fed to weaning calves will help them along till the grass gets a start.

Mangels are scarcely so valuable for sheep as for cattle, but where lambs are dropped in the autumn they are very serviceable, and are much relished by both ewes and lambs. For stud sheep and those intended for exhibition 3lbs. or 4lbs. a day will be found very valuable. They stimulate the milk flow, and on this account are given in small allowance both before and after lambing.

It is stated that when fed in fair quantities to rams or wethers there is a possibility of urinary troubles, but the risk is not a very grave one if a proper proportion of dry feed be used.

Pigs are especially fond of mangels, and in the winter they may be fed largely to breeding sows and growing slips. They are not sufficiently concentrated, however, to form an important feature of the ration for pigs penned up for fattening.

Horses can be given two or three mangels a day in conjunction with straw or other dry fodder, and they will be found to eat them greedily. Brood mares and horses running in the paddocks will derive much benefit from them in the winter, and foals will be all the better of a few pounds daily when being weaned.

Relative Importance of the Crop.—From what has been said in the foregoing pages it is obvious that the mangel is the most valuable root crop that can be grown in districts that suits its development. It has a higher feeding value than swede turnips and is superior to it in keeping qualities. In very cold climates it is regarded as an excellent fodder for the spring and summer, but

in warmer parts, as on the Continent of Europe and in New Zealand, it is esteemed more as a winter and early spring foodstuff. The chief points in favor of the mangel as a farm crop may be summarised as under—

1. It produces heavy returns. Although the average yield is not more than 20 tons to 25 tons per acre, yet in suitable localities from 40 tons to 50 tons are not uncommon, and up to 100 tons per acre have been obtained.

2. It is more nutritious, weight for weight, than turnips or swedes.

3. It keeps better than other roots.

4. It does not taint dairy produce.

5. It withstands a fair amount of drought.

6. It does not suffer from the attacks of insects or fungoid pests to a serious degree.

7. It thrives on a wide variety of soils.

8. It can be grown on the same land year after year, provided it is judiciously manured.

The circumstances that militate against the cultivation of the mangel must necessarily be of some importance; otherwise there would be no need to urge the claims of a crop possessing so many advantages on the farmers in the southern and south-eastern districts of this State. The obstacles raised against it are—

1. It is an expensive crop to grow. The preparation of the land, the system of manuring, the after-cultivation, and the harvesting and feeding of the mangel are all relatively costly operations.

2. It is very susceptible to frosts in certain stages, and for that reason is not suited to grazing, as are turnips and swedes.

3. It is not adapted to districts with a heavy rainfall and a low summer temperature.

4. It cannot be grown with much success on poor light land.

5. It is apt to leave the land in bad mechanical condition if the carting has to be done in showery weather.

The crux of the question is that farmers have difficulty in seeing their way clear to make the crop pay the whole cost of cultivation, and at the same time leave a credit balance as a direct profit. As mentioned in the opening paragraph of this article, however, this is not the proper way to view the matter. The root crop should not be charged with the whole of the manurial and tillage expenses, as the succeeding grain crop will share the profits of the investment; and, again, mangels should be credited with the value of the farmyard manure made from them and with the improvement in the pastures where they have been fed. When the accounts are fairly adjusted in this way, I think it will be found to pay to sow a block of 8 or 10 acres with mangels on most farms, and farmers who have once done so and realised the value of a clump of roots when the paddocks are bare will think hard before they abandon the practice.

(To be continued.)

ST. JOHN'S WORT.

PROCLAIMED A NOXIOUS WEED.

By W. L. SUMMERS.

St. John's wort (*Hypericum perforatum*, L.), which belongs to a group of ornamental garden plants, was originally introduced from Europe on account of its pretty flowers, and in both Victoria and South Australia it has become a nuisance to the landowner. During the past month the necessary resolutions preliminary to St. John's wort being proclaimed a noxious weed were passed by both Houses of Parliament, and His Excellency the Governor has authorised the proclamation. In Victoria very considerable areas of land have been overrun by this weed. In South Australia the area covered by St. John's wort is limited, but it is evidently spreading to new localities. It has been known to exist for fully 20 years in Coromandel Valley, where it occupies a good many acres of pasture besides being in possession of the rough land along the roadsides. It apparently does not thrive except in land with a fair amount of moisture, and up to a few years ago had not been recorded in this State outside the district referred to. During the past few years, however, specimens have been received from Port Lincoln, Meningie, and Klemzig, while it has also steadily spread both north and south of Coromandel Valley.

St. John's wort is useless for stock—indeed, it is reported to be decidedly injurious, causing horses who eat it to break out in sores, while milk cows have a tendency to dry off owing to its effect on the system. The herb books of early days attribute various healing properties to an oily substance extracted from the flowers. The plant is very difficult to eradicate owing to the nature of the root system. On cultivated land there is not much danger of its becoming troublesome, but where the plough cannot be used frequent chopping with mattock or hoe will be necessary to eradicate it. As the plant starts into growth from the perennial root stock in the winter and flowers during early summer, vigorous and continuous efforts during that period will be required.

Our illustration shows a flowering branch and portion of the trailing growth characteristic of St. John's wort, which is a perennial with small opposite leaves of a dull green color. The leaves, if held up to the light, seem to be perforated by minute holes, due apparently to the green coloring matter being absent from these places. The flowers are of a bright yellow, very numerous and attractive. In the early part of winter the plant makes its



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ST. JOHN'S WORT.
(Hypericum perforatum)

growth from the rootstock in the form of trailing stems, which are often of a red-brown color. From these stems numbers of flowering shoots are produced later in the season. In this State the flower stalks are usually from 18in. to 30in. in height, though under adverse conditions they may not exceed 9in. In Victoria it is reported that in the mountain country near Bright it grows to a height of 5ft. to 6ft. The plant reaches maturity in the summer, and by the end of autumn there is practically nothing left but the dry stem and branches.

Some six or seven years ago I tried the effect of various arsenical and other solutions as a means of destroying the weed, the solution being applied with a watering can. At first the results gave promise of an effective remedy, as the plants went brown and all growth above ground appeared to be killed. The following winter, however, the growth was as vigorous as ever, except where an expensive proprietary mixture was used. The plants were fairly mature when the experiment was put in hand, and it is possible that an earlier application, which could be repeated on any second growths, would be more effective.



POULTRY NOTES.

BY D. F. LAURIE, POULTRY EXPERT.

OPERATIONS FOR SEPTEMBER.

Hatching.—Experience points strongly to the importance of completing the hatching of the heavy breeds and of hatching the bulk of the light breeds during this month. Until the middle of October will be late enough, except in the very late districts, for even the light breeds. As regards table birds, chickens may be hatched until November, although the late-hatched chicks do not grow as well as those hatched in August. Still, there is a good market until the end of March or a little later. Ducklings should be hatched not later than the middle of November, especially if for export. Turkeys do very well in the hot weather if supplied with plenty of green food, and excellent results have been had even with December-hatched turkey chicks.

Egg Production.—Late-hatched chickens feather badly, and are not generally thrifty. If they are not in laying condition by the end of April they may hang through the winter without laying, unless in closed scratching-sheds. It is generally agreed that, except in very late districts, chickens hatched after October are not worth rearing, i.e., they are not profitable. I have made extended experiments in this direction at the poultry stations and am quite of the foregoing opinion.

For Laying Competitions.—Many readers who intend entering pens for the forthcoming laying competitions will be interested as to the time of hatching, etc. The next competitions will begin on April 1st, 1912, at Kybybolite and Roseworthy. The main point to be achieved is to have the pullets just about to lay at the end of March or beginning of April. Much trouble and low scoring has been due to pullets being sent to the competitions in full lay. The precise date on which the chickens should be hatched cannot be given; much depends on the strain, the feeding, and the season. The best method to adopt is to hatch a weekly succession of chickens, so that out of three or four lots it will be possible to select competitors at the right stage. If you know about the age at which the pullets you breed are likely to lay you can calculate fairly closely.

Feeding.—Competition chickens, like all others, must be well fed from the start and never suffer a check. The principal mistake made with poultry

is in the matter of feeding the chickens. You cannot take too much care in this matter, nor does the apparently high cost of the best foods signify. The start and subsequent two or three months are of vital importance. Keep the chickens for the first month busy scratching in chaff and sandy, friable soil. Feed them on the best food—rolled oats, hulled oats, best wheat, a little peas and maize, all cracked. Give them earthworms and any insect life you can obtain. As they pass a month you may give a daily feed of mash made of the above grains ground to meal. A little skim-milk is valuable for its salts content. Cut green food, especially the valuable endive, a little garlic, onion (all rich in mineral salts), barley, and barley grass, &c., may be fed liberally. I am convinced that in many flocks the fowls are suffering from the effects of a diet deficient in mineral salts. Shortly, I shall be able to direct breeders' attention to a means of overcoming this serious defect, and am engaged in the preparation of a powder which is not a tonic nor a drug, but is composed of mineral salts, &c., which our poultry foods lack. In the meantime keep a supply of crushed bone, shell and quartz grit, and fine charcoal where the chicks have ready access to them.

Undue Forcing is not good feeding; and while as much variety as possible is highly advantageous, such stimulants as oil cakes and meals, cut green bone, dried blood, &c., should be avoided. These are all of use in due proportion, but the average breeder probably will be over generous in their use.

Competition Fare.—Towards the end of the term, those birds selected for the tests should be penned and fed as at the competitions, so that they may suffer no check from change of food and mode of housing.

Size of Egg.—One of the regulations governing the competitions states that at the end of July the eggs of each pen must weigh not less than 24ozs. to the dozen. In the race to breed for numbers only there were at times signs of great diminution in size of the eggs. This has been checked. It will be remembered that one pen which laid well produced eggs going 17ozs. to the dozen. The distribution of such stock would be disastrous to the industry. Carefully select the stock so as to produce fowls laying eggs 25ozs. to 26ozs. per dozen during the first six months.

The Heavy Breeds.—The above remarks apply more particularly to the light breeds. I am still of opinion that the heavy and medium breeds are out of place in laying competitions. The pens of these breeds in the competitions this year are a great improvement in type and size on those of previous years, and I am, so far, satisfied with their laying. These breeds are for meat production with a fair egg yield; to develop for eggs alone is at the expense of flesh. I am quite aware that some breeders claim that their good laying strains of heavy and medium breeds produce heavy chickens. Not one can show really plump chickens, for the good reason that it would be impossible to do so. Where matters are balanced and the egg yield is fair the chickens fatten more easily. Proof of this is that each year numbers

of chickens bred from laying strains are received at the depot for shipment, and really plump, shapely chickens with a good finish are not plentiful.

Poultry for Export.—Bearing the above remarks in mind, poultry-breeders are urged to hatch and feed well as many chickens as possible. There is a good market for prime quality, but breeders must take more trouble in feeding so as to secure plump, well-finished specimens. A good market has been found, and all that is needed is the co-operation of breeders who should combine to ship thousands in place of the hundreds as at present. Remember that the export trade is making your local market and you should do your share. Table-poultry shows have been held, but for many reasons it is not intended to hold one this year. The poultry will be shipped in small lots as quickly as gathered. Pure breeds and first crosses of the medium and heavy breeds are best suited, although any plump young chickens will do.

Egg Shipments.—Recently an announcement was published in the press asking intending shippers to communicate with the Department, and giving reasons why shipments should be made. So far the response has been meagre. I am accustomed to the apathy of poultry-breeders, but on this occasion I am astonished. Breeders must decide whether they will maintain their independence and heartily join in the shipments, or whether they prefer to grow eggs for dealers to pay what price they think fit. That is the whole question. What I wish breeders to do is to encourage private enterprise among themselves and ship their eggs, and so make for better markets instead of being led by the nose by speculators.

Ducklings for Export.—Breeders are particularly reminded that only ducklings with white plumage are accepted (if otherwise suitable) for export. The favorite duck in the English market is the Aylesbury, and of late years numbers of Pekins are finding a satisfactory market. White plumage is therefore a hall-mark in England. Colored birds are disliked. Although they sell well in the local market, several poulterers have asked me to tell breeders that they much prefer white-plumaged ducklings. Pure Aylesbury, pure Pekin, or the cross between these are suitable. Rouens, Cayugas, Buff Orpingtons, and Runners are not accepted for export—the latter are too small also for table birds. Breed ducklings which will be fat and scale 5lbs. to 6lbs. at 10 weeks. Second season ducks with strong yearling drakes make the best stock birds.

Sunshades.—During the summer one frequently sees the unfortunate birds in yards where there is no adequate shelter from the hot sun. These are easily and cheaply provided, and may be made in various ways and of different materials. They should be as cool as possible and admit free air currents. Permanent shelters 5ft. by 4ft. may be made of two sheets of galvanized iron on a light frame. Give the iron two thick coats of King's compo., which will result in a cool shade. Plant sunflowers all round the runs; the shade will

be appreciated by the fowls, and if the heads are protected from the sparrows a valuable addition to the poultry food will result from the seeds.

Sparrows.—This bird is becoming a costly parasite in poultry yards. Flocks of them devour large quantities of grain. They carry feathers from the tick-infested localities to clean yards. They are also known to be liable to attacks of what is called white diarrhoea in chickens. They thus spread this deadly disease, which was present in several localities last year. Sparrows should be trapped, shot, or poisoned.

Green food.—Before it is too late to do so a good area should be planted with thousand-headed kail, silver beet, &c. Lucerne will, as a rule, be found the most profitable crop, especially where it can be irrigated.

Sanitary Poultry Houses.—I have designed a new scratching-shed house, constructed of iron only; the perches alone are of wood—planed jarrah. This house is thief and vermin proof (including sparrows). It will be found invaluable for securing eggs in winter. For the city and suburbs it is designed to meet the requirements of poultry lovers. The health authorities contemplate some action at no distant date, but this house will meet their views. Hardware merchants and manufacturers can supply the material ready for erection, which can be accomplished in a few hours. Thus, for breeding on a large scale, the 10ft. by 8ft. house will represent a section or unit, and as many as are required may be ordered. They will also make splendid brooder-houses. The floor should be of concrete 3in. thick; over this place 6in. of friable soil or sand, and then some scratching litter. Proper raised stands for food and water vessels can be obtained also. Visitors to the show can inspect the model at the Government exhibit. This house can be taken apart and removed and re-erected in a short period.



CARE OF PIGS.

SOME AMERICAN HINTS.

The following points from addresses by the Hon. C. C. Pervier, of the Illinois Farmers' Institute, are of interest:—

SUMMER CLOTHES ALL WINTER.

Much complaint is heard of pigs not doing well in winter feeding—loss of appetite, failure to fatten, cough, and unthrifty appearance. The hog is the only farm animal that wears his summer clothes all winter. He does not grow a heavier coat of hair for winter protection like the horse or cow, and for this reason more care should be given to make him comfortable at all times.

THREE PRIME ESSENTIALS.

There are three essentials for health, thrift, and gain to be considered in winter management to obtain best results; these are clean food, pure water, and dry comfortable sleeping places.

Clean Food.—The food of the pig should be as clean as for any other farm animal; that is, it should not be mixed or contaminated with any substance that contains no food value. Dirt and filth taken into the stomach along with food impairs digestion and reduces the gain; it also affects the appetite and general health of the pig. Then, too, a considerable part of the food consumed is required to develop energy to separate and expel the indigestible matter.

It is a law of nature that the excrement of all animals is poisonous to themselves, and while pigs may profitably follow cattle, it is of vital importance that their food be not contaminated with their own excrement. This means that pigs should never be fed on the ground in a yard or pen where their own excrement abounds. Feeding on the meadows or pastures, moving about from place to place, is a good way in summer, but in winter feeding from the cribs to ensure cleanliness it is necessary to have a feeding floor, and it should be cleaned after every feed.

CONCRETE FEEDING FLOOR.

A feeding floor is one of several improvements on the farm that pays big interest on its cost, and not only that, but pays back its cost as well. The floor may be made of concrete or planks as preferred, but concrete is everlasting and more easily cleaned. In locating the feeding floor two things should be considered—convenience in feeding and comfort of the pigs while eating their food. The best location is on the south side of a corn crib,

never on the west or north. The west, north, and east sides should be tight boarded 6ft. high, to provide efficient windbreak, but the south side should be open so the sun may shine upon the floor. [Of course in Australia the north side would be the sunny one.—ED.] Never build a feeding floor adjoining the hog-house or sleeping quarters; locate it a few rods away from such places so the pigs will have a short distance to walk for their food and there will be little but cobs to remove from the floor.

PURE WATER.

Over 40 per cent. of a fat pig is water, and a reduction of the water supply below the natural requirements will reduce the gain just as surely as a reduction of food will. Well or spring water is better than water from ponds or streams. Standing or stagnant water about the barns or lots should not be tolerated. Pigs should have clean, pure water always at hand, day and night. They drink but little at a time, yet often, and if it is not always accessible they will not get as much as is required for normal development.

How to have a constant supply of pure water in winter is a problem that each farmer will have to solve for himself.

Concrete Waterer.—We have solved this problem by making a concrete waterer on the barrel and float plan, except that the pigs drink from concrete boxes about 12in. square instead of from the barrel in the old way. The water passes from the barrel into the boxes through holes in a galvanized-iron plate. The dirt cannot get into the barrel, but accumulates in the boxes, from which it can easily be removed. A tank heater is kept in the barrel to warm the water. Pigs will not drink as much water if very cold, as they require, and warming the water has induced them to drink more; besides it is cheaper to warm the water with fuel than to warm it with food.

DRY SLEEPING PLACES.

Pigs must not be allowed to sleep in manure piles, strawstacks, or in any place from which they will come steaming or sweating. The sleeping places must be neither too warm nor too cold, and so arranged that cold winds cannot blow in upon the pigs, yet there must be good ventilation.

Good judgment must be used in bedding the pigs. If on the ground, well protected from cold draughts, but little bedding is needed. If on an elevated floor, more bedding is required to keep the cold from coming up from below. If on a concrete floor, just enough to keep the pigs from coming in contact with the concrete. The bedding should be removed once a week, the sleeping places thoroughly dusted with air-slacked lime, and new bedding provided. Anything that can be done to increase the comfort of the pigs will add to the gain and profit in feeding.

Good care of pigs means good breeding, good feeding, constant watchfulness, more labor, closer attention to little details, and, finally, more dollars in the pocket-book.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, August 9th, there being present Messrs. A. M. Dawkins (Chairman), C. J. Tuckwell, C. J. Valentine, Chas. Willcox J. Miller, G. Jeffrey, G. R. Laffer, A. J. Perkins, Col. Rowell, and the Secretary (G. G. Nicholls).

PIG EXPORT TRADE.

The Hon. Minister forwarded reports from the Manager of the Produce Department and the Trade Commissioner in London. These stated that the latest quotations from the English market were—Fresh pork, 4½d. a pound gross; best factory-cured Australian bacon, 6d. a pound gross. Prices in the Adelaide market ruled at about 5d. a pound, for good porkers, and a little more than 6d. a pound for factory. From those figures it would be seen that there was no margin which would be necessary to cover charges in connection with shipping to the English markets. These charges were approximately 1½d. per pound. Excessive Dutch supplies had caused some glut in London, but the opinion was very strongly expressed that the future held promise of better prices. South Australia could not expect to cater for an overseas market under present conditions of the pig industry, but without doubt a profitable industry could be built up if the majority of breeders would follow the few who now paid proper attention to the breeding and fattening of pigs for market.

RABBIT DESTRUCTION BY ACETYLENE GAS.

The Secretary reported that one of the firm of Messrs. Finlayson & Cousins had informed him that the use of carbide in a tin of water placed in the rabbit burrows was an infringement of their patent rights.

BLOCKS IN NEW HUNDREDS FOR FARM LABORERS.

A resolution was received from the Wilkawatt Branch to the effect that the Government when opening up new country should survey small blocks of fair quality up to 100 acres in extent at intervals among the farming blocks, to encourage farm laborers to take up land and settle in the midst of the farming community. Mr. G. R. Laffer considered that the suggestion was admirable. Such blocks would enable a man to work for the farmers around, and in his spare time cultivate small crops for himself, besides maintaining a horse or two and a few cows. Mr. C. J. Tuckwell thought it scarcely likely that the blocks would be taken up until after the neighboring areas had been settled. The Secretary suggested that such blocks would provide breeding

places for rabbits unless some provision were made for the pest to be kept down. Mr. Tuckwell said that there was no doubt that working men's blocks among the farms were a great advantage. There were several at Wilmington. The vermin difficulty could be overcome by letting the blocks to the adjoining holders for a short period at the outset. It was decided to refer the resolution to Congress.

STANDARD FRUIT CASES.

A letter was received from the South Australian Fruitgrowers and Market Gardeners' Association, stating that that organisation and its various branches had unanimously favored imperial bushel cases having measurements in harmony with those of the cases used in the other States for both local and export trade. Mr. Laffer intimated that the Minister of Agriculture had promised to introduce a Bill, a draft of which was being considered, to make provision in the direction indicated.

NOXIOUS WEEDS.

The following resolution was received from the Mount Remarkable Branch :—
“ In connection with the administration of the Noxious Weeds Act this Branch is of opinion that the Act will never be satisfactorily administered by the district councils, owing to their individual members being among the worst offenders and their disinclination to visit the penalties of the law upon their constituents. Therefore, this Branch suggests that the administration of the Act should be vested in the officers of the Crown.” The Redhill Branch had forwarded a resolution—“ That the matter of dealing with noxious weeds be considered at the Annual Congress ; and that an inspector be appointed to deal with the whole question.” The members of the board agreed that the subject of noxious weeds needed serious and prompt attention, and decided to bring the matter before Congress.

ERADICATION OF SCALE OF CITRUS TREES.

Attention was drawn by Mr. Laffer to the necessity for early action in regard to this orchard pest. After some discussion it was decided to ask the Hon. Minister to expedite the matter of fumigation by the Department. The Secretary mentioned that the Minister was dealing with the matter.

AGRICULTURAL BUREAU EXTENSION.

The Secretary reported that he was arranging to send letters to each of the producers within say 10 miles of country conferences, who were not members of the Bureau, inviting them to attend. The opportunity would then be taken to bring before them the advantages to be derived by association with the Branches. The visitors would be able to take part in discussions, but would not be able to vote.

FIVE NEW BRANCHES.

Approval was given to the formation of new Branches of the Bureau, as follows, with the undermentioned gentlemen as members :—

Monarto South.—Messrs. R. S. McDonald, E. Anders, A. P. Braendler, C. F. Altmann, G. Patterson, A. Patterson, C. Thiele, M. Nolan, C. Hill, H. A. Hein, G. Thomas, jun., J. Whittaker, E. Tilbrook, H. Frahm, P. H. Heinicke, F. Barman, R. Hartmann, J. F. Woodhead, A. H. Harper, G. E. B. Gruhl, G. A. Hartman, P. W. Richards.

Moorlands.—Messrs. C. F. Bauer, H. Miatcke, A. Miatcke, E. Miatcke, L. Spurr, R. Spurr, H. Draper, A. Maczkowiach, C. Lawson, L. Lawson, A. Oppatt, P. Neumann, N. Neumann, A. Gower, J. Bywaters, J. Schubert, H. E. Draper, C. S. Fead.

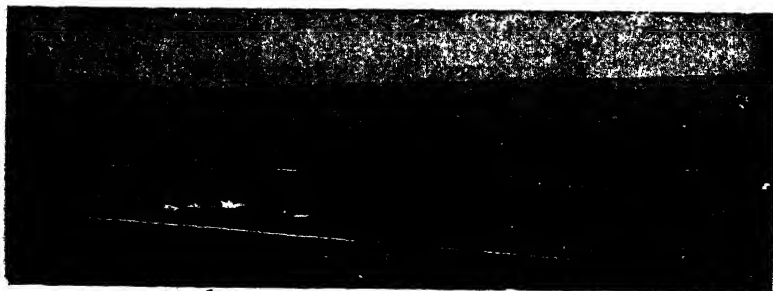
Warcowie.—Messrs. A. G. Telfer, T. Donellan, J. Feineler, jun., P. J. Donellan, T. Ryan, E. Sanders, F. Crossman, W. Crossman, J. W. Seal, C. A. Hilder, T. J. Duffy, C. A. Jarvis, T. Newton, F. A. McAskill.

McGillivray.—H. Ayriss, A. Burfitt, A. Daw, A. Nicholls, — Petras, A. Stirling, sen., A. Stirling, jun., R. Wheaton, H. J. Widdrowski, H. C. Williams, W. C. Burgess.

Leighton.—I. J. Warner, J. Q. Hogan, J. Hogan, M. Hogan, A. McWaters, R. McWaters, E. Oates, A. D. McDonald, J. M. McDonald, D. Kain, A. Bailey, W. Jeffery, R. J. Fairchild, G. Pryde, T. Goodridge, Jas. Earle, W. H. Lloyd, W. Bailey, Wil. Bailey, G. Hams, W. Morgan.

The following gentlemen were approved as members of the undermentioned Branches :—

Messrs. J. Temby and H. C. G. Hammond, Parrakie ; P. Fettke, Morgan ; S. H. Chambers and J. H. White, Clare ; F. P. Howell and G. C. Binney, Utera Plains ; P. G. Wilson, Miltalie ; R. Paynter, W. Fricker, J. L. Leopold, and J. Absalem, Arden Vale ; W. Stewart and F. B. Price, Mount Bryan ; T. Bishop, Mitchell ; J. Dicks, H. F. Richter, Port Pirie ; W. Salter, Angaston ; F. Gregory, Coomooroo ; G. F. Holloway, Mount Gambier ; C. Parker, Green Patch ; J. Brown and C. Walters, Georgetown ; S. G. Barr, Pine Forest ; H. Jacobs and H. Lewis, Cherry Gardens ; C. Holman, W. Rodda, and S. R. Price, Paskeville ; R. F. Richardson and L. Smith, Koppio.



THE WHEAT MARKET.

The tone of the wheat market during August was an improving one, and at the beginning of September the price on trucks at Port Adelaide was 3s. 6½d. per bushel. This rise accorded with advices of sales at improved rates in Great Britain. In some quarters it is attributed to the disturbed political atmosphere of the old world, but is more probably connected with unfavorable reports of the output in Russia and the United States.

Writing on August 4th, *Beerbohm's Evening Corn Trade List* states — “The tone of the wheat market, under the influence of continued unfavorable advices regarding the prospects of the spring wheat crop in the United States, and the reserved attitude of Russian and Indian shippers so far as distant positions are concerned, has been quite firm, and there has been an improvement in the consumptive demand Until a more definite opinion can be formed as to the actual outturn of the Russian crop, and also the probable yield of the spring wheat crops of the United States and Canada, the situation, so far as regards the quantity of wheat available for export during the present season, will remain uncertain. Estimating the shipments from Russian and the Balkans at 15,000,000qrs. less than last season, and from America and Canada at 5,000,000qrs. more, and allowing an equal export from all other countries to that shipped in the 12 months ended July 31st, the total quantity available would be about 10,000,000qrs. less than in the season 1910-11. According to the information received by the officials at St. Petersburg, this year's Russian crop is a very bad one in 10 provinces or territories, but satisfactory in the rest of the empire. What this represents in figures it is impossible to say. With regard to the United States, the latest reports point to the total yield of winter and spring wheat being very little different from that of last year, but it is still thought that Canada will grow fully 5,000,000qrs. more than in 1910.”

The total shipments of wheat and flour to Europe during the year ended July 31st were as follows :—

	Season 1910-11. Qrs.		Season 1909-10. Qrs.
United States and Canada	12,820,000	..	15,865,000
Argentina and Uruguay	9,470,000	..	5,555,000
Russian and Black Sea ports . .	28,060,000	..	27,565,000
Danubian ports	10,595,000	..	4,355,000
India	6,750,000	..	3,860,000
Australasia	5,755,000	..	4,365,000
Sundries	1,505,000	..	1,770,000
	<hr/>		<hr/>
	74,955,000		63,335,000

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Aug. 7	Market steady, but quiet	3/4	3/6 1/4	3/5 1/4
8	—	Do.	Do.	Do.
9	Very firm; June-July, 4/3 1/4	Do.	3/7	3/5 1/4 to 3/6
10	Firm; April-May, 4/3 3/4	3/5	Do.	3/5 to 3/6
11	May-June, 4/4 1/4; July-August, 4/4 1/2; August-September, 4/5 1/2	Do.	Do.	Do.
12	Very firm; August-September, 4/6; Liverpool, Aug.-Sept., 4/5 1/2	Do.	Do.	Do.
13	—	3/6	3/7 1/4	3/6 to 3/6 1/2
14	Steady; March-April, 4/4 1/2; Liverpool firm	3/5	3/7 1/4	Do.
15	Dull; offers lower	Do.	Do.	Do.
16	Unchanged	3/4	3/7	Do.
17	Steady, but quiet	Do.	Do.	3/5 to 3/5 1/2
18	Firm, but quiet	Do.	Do.	3/5 to 3/6
19	—	Do.	Do.	Do.
20	Quiet, with easier tendency	3/6	3/7 to 3/7 1/2	Do.
21	Firmer; August-September, 4/5 1/2	Do.	Do.	Do.
22	Steady	Do.	3/7 1/2	3/5 to 3/5 1/2
23	Firm, but inactive	Do.	3/7 1/2	Do.
24	Dull; easier; April-May, 4/4	Do.	3/7 1/2	Do.
25	Firm, and held higher	Do.	Do.	Do.
26	Do.	Do.	Do.	3/5 1/2
27	Held for 3d. advance; August-September, 4/5 1/2	Do.	Do.	Do.
28	Quiet; 4/4 off coast	Do.	Do.	Do.
29	—	3/6	3/7 1/2 to 3/8	3/6
30	Very firm; August-September, 4/6 1/4	3/6 1/2	Do.	3/6 1/2
31	Firm, and held for 6d. advance; September-October, 4/7 1/2	3/6 1/2	Do.	Do.
Sept. 1	Strong, and rather dearer; Liverpool held for advance	3/7 1/4	3/8	3/7 1/2
2	—	Do.	3/8 1/4 to 3/9	Do.
3	—	Do.	Do.	Do.
4	—	Do.	Do.	Do.
5	—	Do.	Do.	Do.

STEAMER FREIGHTS.—Steamers from South Australia to United Kingdom-Continent, full cargo rates 26s. 9d. to 27s. per ton (8 1/2d. to 8 1/2d. per bush.). Parcels, Port Adelaide to London-Liverpool, 23s. 9d. per ton (7 3/4d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2 1/4d. per bush.); to Sydney, 10s. 6d. per ton (3 1/4d. per bush.).

SALEER FREIGHTS.—From South Australia to United Kingdom-Continent, 24s. 6d. to 25s. per ton (7 1/2d. to 8d. per bush.); to South Africa, 20s. per ton (6 1/2d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for August, 1911, at the undermentioned stations, also the average total rainfall for the first eight months in the year, and the total for the first eight months of 1911 and 1910 respectively:—

Station.	For Aug., 1911.	Average to end Aug.	To end Aug., 1911.	To end Aug., 1910.	Station.	For Aug., 1911.	Average to end Aug.	To end Aug., 1911.	To end Aug., 1910.
Adelaide	0.76	15.01	9.80	17.45	Hamley Bridge	0.83	11.58	9.41	15.58
Hawker	0.93	8.25	5.93	13.15	Kapunda....	0.77	13.83	10.54	19.79
Craddock	0.99	7.31	5.27	11.48	Freeling	0.81	12.52	9.97	16.52
Wilson	1.00	8.00	4.67	14.33	Stockwell ...	0.81	14.23	12.02	17.95
Gordon	0.91	5.97	4.90	8.43	Nuriootpa ...	0.68	14.96	9.63	20.70
Quorn	0.89	9.54	5.75	13.83	Angaston ...	1.11	15.25	14.99	21.52
Port Augusta	1.16	6.23	5.96	12.87	Tanunda	0.96	16.64	16.09	22.29
Port Germein	1.23	8.59	7.02	14.35	Lyndoch ...	1.25	16.34	12.69	20.63
Port Pirie ...	1.06	8.87	9.54	17.79	Mallala	0.82	11.87	9.90	15.48
Crystal Brook	1.22	10.46	10.15	14.75	Roseworthy .	0.71	12.25	8.68	16.67
Pt. Broughton	1.03	9.96	9.54	13.84	Gawler	0.64	13.68	9.47	19.50
Bute	1.29	10.91	12.18	17.90	Smithfield ..	0.76	11.76	10.11	16.40
Hammond ...	1.70	7.37	9.21	13.80	Two Wells ...	1.10	12.16	8.11	14.13
Bruce	0.92	6.14	4.54	13.59	Virginia	0.71	12.65	8.92	17.00
Wilmington .	1.15	12.36	10.92	19.35	Salisbury ...	1.05	13.36	12.05	17.41
Melrose	1.54	16.11	12.07	24.99	Teatree Gully	0.87	20.16	13.62	29.05
Booleroo Cntr	1.10	10.76	7.27	16.25	Magill	0.88	18.62	13.61	27.78
Wirrbarra ...	1.60	13.00	8.45	20.02	Mitcham	1.10	19.72	12.76	23.37
Appila	1.45	9.94	8.92	19.12	Crafers	3.57	34.03	31.12	51.38
Laura	1.44	11.99	10.58	19.92	Clarendon ...	2.34	24.98	20.66	32.85
Calbowie	1.71	11.34	11.34	15.54	Morphett Vale	2.11	17.15	13.96	22.71
Jamestown ...	1.33	11.38	12.41	16.64	Noarlunga ...	1.36	14.84	13.59	21.20
Gladstone ..	1.40	10.53	10.88	12.72	Willunga	1.80	19.06	18.90	27.07
Georgetown ..	1.38	12.56	11.32	15.52	Aldinga	1.49	14.97	12.37	21.54
Narriady	1.39	11.63	11.62	13.77	Normanville .	1.20	15.32	13.31	19.28
Redhill	1.21	11.57	9.79	19.04	Yankalilla ...	1.84	16.62	15.97	20.00
Koolunga ...	1.22	10.92	9.72	17.77	Eudunda	0.98	11.74	11.38	12.93
Garrieton ...	1.14	8.12	6.49	16.08	Sutherlands ..	0.44	—	7.00	9.69
Borealis	1.10	8.83	6.91	15.14	Truro	0.88	13.58	11.63	19.65
Johnsburg ...	0.98	6.49	5.69	12.23	Palmer	1.63	—	8.56	13.34
Grarooc	1.27	9.34	6.41	14.53	Mt. Pleasant .	1.99	19.44	15.82	24.29
Black Rock ..	1.32	3.37	7.38	15.19	Blumberg ...	2.06	21.74	16.43	26.90
Petersburg ...	1.15	8.65	8.22	13.16	Gumeracha ...	1.89	24.05	19.35	35.19
Yongala	1.22	9.11	9.02	13.33	Lobethal	2.20	26.23	21.45	35.92
Terowie	0.94	8.86	8.03	16.06	Woodside ...	1.95	22.67	20.99	33.36
Yarowowie ...	1.01	9.11	9.17	16.85	Hahndorf	2.31	25.58	24.63	33.04
Hallett	0.89	11.08	10.28	13.92	Nairne	1.71	20.63	21.25	29.30
Mount Bryan	0.92	10.77	8.96	14.65	Mt. Barker ..	1.89	22.32	20.63	29.85
Burra	0.90	12.25	11.01	17.18	Echunga	1.99	23.54	23.73	35.91
Snowtown ...	1.41	11.07	8.40	15.31	Macclesfield .	1.47	21.70	20.92	31.74
Brinkworth ..	1.12	10.17	9.56	16.36	Meadows ...	1.87	25.51	24.64	35.53
Blyth	1.31	11.31	10.42	14.42	Strathalbyn .	0.78	13.57	13.40	21.59
Clare	1.51	17.11	14.78	22.09	Callington ...	0.70	11.21	9.20	14.98
Mintaro Cntrl.	1.32	15.37	13.85	10.34	Lange's B ...	0.46	10.66	8.40	12.75
Watervale ...	1.17	19.38	16.19	20.84	Milang	0.34	12.14	6.50	14.44
Auburn	0.89	16.94	14.86	22.67	Wallaroo	1.44	10.97	11.44	14.51
Manoora	0.82	12.45	9.93	15.04	Kadina	1.15	11.63	10.80	16.09
Hoyleton	0.74	12.93	11.16	12.89	Moonta	1.31	11.16	9.80	16.20
Balaklava ...	0.77	11.21	10.34	14.19	Green's Pines .	1.36	11.48	8.23	16.29
Pt. Wakefield	0.95	9.50	12.54	11.65	Maitland	1.25	14.82	13.97	20.16
Saddleworth .	0.90	14.08	10.58	16.07	Ardrossan ...	0.94	10.09	9.40	13.32
Marrabel	1.01	12.32	8.37	15.95	Pt. Victoria ..	1.17	11.17	11.64	13.80
Riverton	0.95	14.40	12.42	19.60	Curramulka .	1.39	13.81	11.38	17.05
Tarlee	0.60	12.16	9.18	15.29	Minlaton	1.23	13.09	10.71	15.29
Stockport ...	0.82	11.22	8.21	11.58	Stansbury ...	1.11	12.42	11.99	16.20

RAINFALL TABLE—continued.

Station.	For Aug., 1911.	A'v'ge. to end Aug.	To end Aug., 1911.	To end Aug., 1910.	Station.	For Aug., 1911.	A'v'ge. to end Aug.	To end Aug., 1911.	To end Aug., 1910.
Warooka....	1-82	13-34	14-52	16-41	Bordertown .	1-59	13-47	11-36	13-30
Yorketown .	1-31	12-98	11-40	15-82	Wolseley....	—	11-85	—	14-45
Edithburgh..	1-11	12-19	9-84	16-47	Frances.....	1-30	13-61	14-71	16-11
Fowler's Bay.	2-83	9-60	10-61	7-85	Naracoorte .	1-45	15-56	15-04	17-40
Streaky Bay.	2-47	11-86	12-63	12-68	Lucindale ...	0-97	16-57	17-20	20-37
Pt. Elliston..	2-02	12-66	14-14	14-42	Penola.....	1-53	18-71	19-02	22-21
Pt. Lincoln..	1-31	15-16	13-35	17-79	Millicent ...	2-99	21-43	25-06	26-50
Cowell	0-79	8-31	7-84	9-30	Mt. Gambier.	3-00	22-44	24-45	29-74
Queenscliffe .	—	14-00	—	28-45	Wellington ..	0-71	10-37	8-61	13-01
Pt. Elliot....	1-21	14-95	11-49	16-89	Murray Bidge	0-39	9-76	7-07	15-97
Goolwa	0-72	12-77	12-10	17-07	Mannum ...	1-16	8-18	4-99	13-39
Meningie....	0-80	13-66	10-31	14-51	Morgan	0-39	5-83	5-67	8-66
Kingston....	1-87	18-33	16-47	19-83	Overland Crnr	0-45	7-27	8-05	12-48
Robe	1-33	18-81	18-02	22-87	Renmark ...	0-43	6-72	7-61	10-33
Beachport...	2-99	20-84	23-78	26-67	Lameroo ...	—	—	—	12-32
Coonalpyn ..	1-45	12-30	10-81	11-39					

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on September 1st—
BUTTER.

The supply of cream during the month has not been so large as for the corresponding period last year, but the quality has been excellent, and the demand for butter has been well maintained. Prices have eased, the present being:—Superfine, 1s. 1d.; pure creamery, 1s.

Messrs. A. W. Sandford & Co. report on September 1st—

BUTTER.—As a result of the lateness of this season forwardings have not been as heavy as at the corresponding period of last year, but towards the end of the month the increase in quantities was somewhat more pronounced. Meanwhile—under the influence of the heavy demand—values were sustained. Best factory and creamery fresh in prints, from 11d. to 1s. 1d. per lb; second-grade factory, from 9½d. to 10d.; choice separators and dairies, from 9½d. to 11d.; medium quality lines, from 8d. to 8½d.; stores and collectors', from 7½d. to 8½d.

EGGS.—Forwardings are arriving in heavier quantities, but as there is an equally active demand lowerings so far have only been gradual, and good clearances have been effected. Prime guaranteed new-laid hen, 8½d.; ducks, 9d.

CHEESE.—After several months of dullness in this line a betterment has set in, sales being brisk for all well-known established brands at advanced rates. New season's makes, 6½d. to 7½d.; matured, 8d.

BACON.—As usual during the winter, a dull time has been experienced. Towards the end of the month, however, a slight improvement set in for prime factory-cured sides, middles, and rolls, but there was very little call for roughly-butchered farm-cured lots. Factory-cured sides of bacon, from 6½d. to 7½d.; middles, from 7½d. to 8½d.

HAMS.—In calico, 8½d. to 9½d.

LARD.—In skins, 5d.; bulk, 4½d.

HONEY.—Lines of choice clear extracted in good request at 3d.; beeswax, 1s. 2d.

LIVE POULTRY.—The catalogue being extensive attracted brisk competition, and full rates were obtained, especially for all coops of prime table sorts. Good table roosters, from 3s. to 3s. 6d.; plump hens and nice-conditioned cockerels, 2s. to 2s. 6d. light sorts, 1s. 6d. to 1s. 9d.; ducks, 2s. 6d. to 3s. 6d.; geese, 3s. 6d. to 4s. 6d.; pigeons, 8½d.; turkeys, 7d. to 9½d. per lb. live weight, for fair to good table birds.

POTATOES.—Owing to the varying qualities of Gambiers this season business has been considerably restricted, excepting for well-conditioned lots. Quotations, £3 10s. to £3 15s. on trucks, Gambier, per ton of 2,240lbs.

ONIONS.—These experienced a fair turn over, but as the season is late holders are more ready to quit. Quotations, £4 to £4 5s. on trucks, Gambier, per ton of 2,240lbs.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Sept.	Oct.			Sept.	Oct.
Amyton	160	5	3	Meningie	†	9	7
Angaston	*	9	7	Millicent	194	12	10
Appila-Yarrowie	165	—	—	Miltalie †	177	9	7
Arden Vale & Wyacca	161	—	—	Minlaton	176	16	14
Arthurton	174	—	—	Mitchell	*	9	7
Balaklava	*	—	—	Monarto South	†	—	—
Beetaloo Valley	166	—	—	Monteith	181	—	—
Belalie North	†	2	7	Moonta	†	—	—
Blyth	172	12	10	Morchard	†	—	—
Bowhill	*	—	—	Morgan	181	9	—
Bowmans	*	7	5	Moorlands	†	—	—
Bute	*	6	4	Morphett Vale	190	—	—
Butler	*	—	—	Mount Bryan	167	2	7
Caltowie	166	2	7	Mount Bryan East	167	2	7
Carrieton	†	7	5	Mount Gambier	†	—	—
Cherry Gardens	184	5	3	Mount Pleasant	190	8	13
Clare	172	8	6	Mount Remarkable	162	6	4
Clarendon	185	4	2	Mundoora	*	—	—
Colton	†	9	7	Nantawarra	173	6	4
Coomooroo	161	—	—	Naracoorte	195	9	14
Coonalpyn	†	—	—	Narridy	†	—	—
Cradoek	161	9	7	Northfield	†	5	3
Crystal Brook	†	—	—	Parrakie	181-2	23	7
Cummins	176	9	7	Paskerville	†	7	5
Davenport	161-2	—	—	Penola	197	2	7
Dawson	†	—	—	Penong	†	9	14
Dingabledinga	*	8	13	Petina	178	—	—
Dowlingville	*	—	—	Pine Forest	†	5	3
Elbow Hill †	176	—	—	Port Broughton	*	8	6
Forest Range	185	7	5	Port Elliot	190-1	16	21
Forster	180	—	—	Port Germein	167	23	—
Frances	†	8	6	Port Pirie	168-9	6	7
Freeling	†	—	—	Quorn	163	9	—
Gawler River	172	—	—	Redhill	170	5	3
Georgetown	166	9	7	Renmark	183	—	—
Geranium	†	30	28	Saddleworth	*	15	20
Green Patch	176	4	2	Salisbury	174	5	3
Gumeracha	186	4	2	Shannon	179	—	—
Hartley	187	9	7	Sherlock	*	9	—
Hawker	†	11	9	Stockport	†	—	—
Hookina	162	9	—	Strathalbyn	†	4	2
Kadina	*	7	5	Sutherlands	*	—	—
Kalangadoo	192	9	14	Tatiara	*	2	7
Kanmantoo	†	2	7	Uraidla and Summert'n	191	4	2
Keith	192	9	7	Utera Plains †	†	2	7
Kingscote	187	5	3	Waikerie	183	—	—
Kingston	193	30	28	Warcovie	*	—	—
Koppio	177	7	5	Watervale	*	—	—
Kybybolite	†	7	5	Wepowie	163	—	—
Lameroo	180	—	—	Whyte-Yarcowie	170	16	7
Leighton	*	—	—	Willowie	163	5	3
Lipson	*	—	—	Willunga	†	2	7
Longwood	187	6	4	Wilkawatt	184	9	7
Lucindale	193	16	—	Wilmington	165	6	4
Lyndoch	188	—	—	Wirrabara	†	—	—
Maitland	175	7	5	Woodside	191	—	—
Mallala	173	4	2	Yadnarie	†	9	7
Mannum	*	30	28	Yallunda	*	—	—
MacGillivray	*	—	—	Yongala Vale	171	9	7
Meadows	189	4	—	Yorketown	†	9	14

* No report received during the month of August. † Only formal business transacted at the last meeting.
 ‡ See p. 179 for report of Conference of Miltalie, Utera, and Elbow Hill Branches.

REPORTS OF MEETINGS.

Edited by GEORGE G. NICHOLLS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Amyton, July 18.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. T. O. Donoghue (chair), Ward, Griffin, Wallace, Crisp, Gunn, Brown, Cormack, Baumgurtel, Thomas (Hon. Sec.), and two visitors.

CARE OF SHEEP.—Mr. Wallace read a short paper on "The Care of Sheep." He said he would lay the foundation of his flock by purchasing Merino ewes. Rams would be put with these so that the lambing would commence about the first week in May, as at about that time there is generally some green feed. Rams should not remain with ewes for a period longer than six weeks, nor should each ram have more than 50 ewes. Wethers and ewes should not run together, as the former torment the latter and bring themselves down in condition. All sheep on the farm should be crutched at the beginning of the first rains, so as to keep them from becoming daggy. Wool should also be cut from round the eyes. With regard to mating, he would not breed from ewes until they were rising four-tooth. Six-tooth or full-mouthed ewes were the best to breed from, and made better mothers. Ewes should not be kept after they had reached the age of 5 years, and broken-mouthed sheep were of no use on the farm. Ewes should be culled before shearing; the good woolled ones kept, and the culls sold after they are shorn. Wether bellies should be pizzled before putting in the bail. Bad fleeces should be torn up and put with pieces. In the discussion which followed Mr. Gunn said he thought it necessary to have the lambs dropped early in April, or they would be too young for the freezers. Late lambs were not good for freezing purposes. Other members contended that although the time was lessened by one month, yet it assured a stronger ewe on plenty of feed, and so assured a lamb that would thrive from start to finish. This was very necessary where lamb-raising was engaged in on a large scale; where only a small flock was kept it was not so important.

Amyton, August 3.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Donoghue (chair), Brown, Gunn, Ward, Cormack, Corcoran, Thomas, Mills, Aitken, Crisp (Hon. Sec.), and six visitors.

HORSE-BREEDING.—Mr. R. Brown read a paper on this subject, in which he said breeding horses at the price realisable for stock at present was a most profitable undertaking. Only the very best mares obtainable should be bred from, and he would rather use a pedigree mare, even if it were on the small side, than a mare of better size but of which there was no knowledge of ancestry. He would breed from mares between the ages of three and twelve years. A healthy and vigorous filly at four years should throw a foal of good quality. Foals dropped early in August were to be preferred, but this sometimes interfered with the farm work if there was not sufficient other stock available. Mares should have one month's spell before foaling, and should receive best feed and attention directly after. He said that the better class of stallions was not patronised in a great many instances because the owners of the animals placed no limit on the number of mares served during the season, with the result that the percentage of foals left was very small. Considerable discussion followed the reading of the paper, and it was decided to confer with other Branches, with the idea of having all stallions and mares registered, so that a check could be kept on horses which were unsuccessful foalgetters.

Arden Vale and Wyacca, August 7.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Willis (chair), M. and A. Eckert, Leopold, Paynter, Absalem, E. and W. Klinberg, Fricker, P. Hanneman, O. Hanneman (Hon. Sec.), and five visitors.

DAIRYING.—Mr. M. Eckert read a paper on this subject. He said it did not pay to keep many cows in this district if labor had to be employed. He had eight or 10 cows which he used to feed on cocky chaff and pollard with very good results. He had also fed crushed wheat, and although the cows did not take readily to it, when they became used to it very rich cream was produced. When his herd became larger he fed them on long hay out from the patches of his crops in which wild oats were troublesome. The oats were too ripe, and as a consequence the milk flow was not so good. Oatey hay fed to cows tended to dirty the land. Crops in the district this year were dirty, and the question arose as to the best means of disposing of them. As chaff merchants preferred wheaten hay to oaten, it would not be advisable to cut them for hay. He thought the most profitable procedure was to feed the oatey patches to surplus stock, and so fatten them. Ensilage would be an admirable way of disposing of the crop if the process would destroy the germ of the seed. Members, in discussing the paper, generally agreed that it was advisable to keep a limited number of cows.

Coomooroo, August 11.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Berriman (chair), H. and S. Avery, Robertson, Brown, Hall, E. W. Brice, E. C. Brice (Hon. Sec.), and three visitors.

HORSE-BREEDING SOCIETIES.—The formation of a horse-breeding society in the district was discussed at some length. At present it was too late in the season to go into the matter. The general opinion of members was that the scheme would encourage the introduction of good draught stallions, and do away with the second rate horses. It would also mean a better percentage of foals, which was a great consideration to the farmer.

FIELD TRIAL OF IMPLEMENTS.—On August 3rd, in the presence of about 200 interested persons, a field trial of implements was held at Eureka, under the auspices of the branch. The work done by the various makes was very creditable. Messrs. Shearer & Son, of Kilkenny, secured two first and one second prize, Mr. T. Fisher gained first prize, with Mr. P. J. Byrnes second, in the class for cultivators. In the cultivating plough class first honors fell to Mr. C. H. Smith.

Craddock, August 5.

(Average annual rainfall, 10½in.)

PRESENT.—Messrs. McAuley (chair), Graham, Finch, Paterson, Clarke, Allams, Glásson, Hilder, Jago, Gillick, Fitzgerald, Smythe, Solly, McAuley (Hon. Sec.), and one visitor.

HORSE-BREEDING SOCIETIES.—Professor Lowrie's scheme for the establishment of horse-breeding societies was discussed. It was unanimously agreed that the uncertainty of the rainfall in the district precluded the adoption of a scheme that embraced the heavy Clydesdale so much. Northern parts would not sustain the heavy class of horse. On land so easily worked as this district the medium light-bone horse would outwork the heavier animal and would not require the same quantity of feed.

Davenport, July 20.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Roberts (chair), Bothwell, Gosselin, Holdsworth, Messenger, Sanderson, and Lecky (Hon. Sec.).

SEAWEED AS MANURE.—The Secretary read an article from the *Garden and Field* entitled "Seaweed as Manure." It was claimed by the writer that if seaweed was allowed sufficient time in the soil to decompose it was as good as farmyard manure. In some respects it was better on account of its freedom from weed seeds, eggs of insects, and germs and spores of plant diseases. It contained in its moist state 0.4 per cent. of nitrogen, 0.7 per cent. of potash, and less than 0.1 per cent. phosphoric acid. The opinion of members was that the rainfall was not sufficient to decompose seaweed in this part of the State.

Davenport, August 8.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Roberts (chair), Bothwell, Nestor, Bice, Hobby, Sanderson, Holdsworth, Lecky (Hon. Sec.), and one visitor.

FOOD AND DRUGS ACT.—Mr. J. Holdsworth contributed a very interesting paper on "The Food and Drugs Act," the various provisions of which he explained lucidly. With reference to that portion dealing with the rules to be observed by local dairymen, he said—"Clause 37 of part v. provides—(1) For every vessel to be kept clean. (2) Premises to be cleansed daily and refuse removed three times a week. (3) In April and October premises are to be thoroughly washed with lime-wash made from freshly burnt lime, each gallon containing 4ozs. of dry chlorinated lime applied to every part of the premises with which animals have come into contact. (4) Every shed shall be roofed watertight, floored with smooth impervious hard stone, brick, concrete, or mineral asphalt or impervious material so that no liquid can percolate through; every cowyard shall be cleansed before noon, all refuse being collected into a box provided for the purpose. Every cowshed shall have an air space of 600 cub. ft. in Metropolitan District. Every vendor is required to affix to and maintain on every vehicle, or cart used, his name, licensed cow-keeper, dairyman, or licensed vendor of milk. Licences must be applied for and each person must be registered, and upon the certificate of the inspector the board grants the licence. I may say that milk shops and ice-cream vendors come under the same provisions so far as they relate to cleanliness of utensils, plant, &c. All utensils to be cleansed by scalding water. Inspectors as stated in the Act have full power to purchase milk at any time; and in the presence of the vendor seal up the milk obtained in bottles, each sample in triplicate, and forward the same for analysis."

Hookina, August 5.

PRESENT.—Messrs. B. Sheridan (chair), H. and J. Henschke, F. Stone, J. Carne, P. and B. Murphy, Madigan (Hon. Sec.), and one visitor.

POULTRY INDUSTRY.—On August 1st the Poultry Expert (Mr. D. F. Laurie) delivered a lecture to an appreciative audience. At this meeting of the Bureau the subject of Mr. Laurie's lecture was discussed.

BUREAU WORK.—Mr. B. Sheridan read a short paper, in which he said more interest should be taken in the Bureau by farmers. More papers should be read. No matter how short a paper was, the discussion resulting therefrom might open up matters of considerable importance. Members should be punctual, and come prepared to speak on the subjects in hand.

HORSE-BREEDING SOCIETIES.—Owing to its being so late in the season it was decided to leave the formation of a horse-breeding society until next year. In the mean time the matter would be considered by members.

Mount Remarkable, August 9.

(Average annual rainfall, 21in.)

PRESENT.—Messrs. Bauer (chair), McIntosh, Giles, Casley, Oldland, Foot, George, and Davie (Hon. Sec.).

HANDLING AND CARRIAGE OF POTATOES.—A discussion took place on the paper, which was read at the last meeting of the Branch by Mr. Casley, and which was printed in the August issue, page 75. Mr. Giles thought the price of labor would militate against the manufacture of baskets for the carriage of potatoes at a sufficiently low price. Mr. George thought the cost of distribution would be too great. Mr. McIntosh pointed out that sometimes the price of the tubers at Mount Gambier was so low that the crop, or part of it, stood on the ground in bags, and no steps were taken by the growers to have it removed. It was generally considered a matter for regret that cost of haulage and middlemen's profits raised the price from, say, 2s. or 2s. 3d. a bag at Mount Gambier to 6s. or more at this place. The Chairman spoke of the possibility of baskets getting and retaining the germs of potato disease long enough to distribute the germs to previously clean districts. Mr. Davie described the transshipment of potatoes from narrow to broad gauge trucks at Wolsley, and said that some accounts of high stacking and rough handling by transshippers were exaggerated. Growers often sent away a good bucketful of earth clinging to the potatoes, and it was not to be wondered that the flavor of the tubers was

Quorn, August 5.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. R. Thompson (chair), Noll, Finley, Cock, Britza, Schulze, and Patten (Hon. Sec.).

ENSILAGE.—Mr. Britza read a short paper on this subject. Oats and weeds could be cut before they seeded and made into ensilage. With the aid of the binder he had cut heavy oat crops mixed with weeds of all descriptions. He ploughed the land from which these crops were cut at about the beginning of October, harrowed it, and then ploughed it again at seeding time. After this ploughing it was harrowed again, and then wheat was drilled in. As a result the wheat crop was clean. Not only had the cutting of the oats and weeds the effect of cleaning the land, but the ensilage was of very considerable feeding value. Chaffed, and with a little pollard sprinkled on it, it was fed to pigs with advantage. Chaffed ensilage mixed with cocky chaff made a very good ration for cows; and mixed with pollard, moistened with separator milk, it made a very acceptable change of diet for poultry. In reply to a question, Mr. Britza said that he chaffed the outside of his ensilage stack for horses. It was easier to cut it with the ordinary mower than the binder. He preferred covering the stack with about 2ft. of straw and weigh it down with earth.

Wepowie, August 10.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Crocker (chair), Gale, Rielly, Roberts, Roocke, Pearce, Crystall, and Orrocks (Hon. Sec.).

CARE OF FARM STOCK AND IMPLEMENTS.—Mr. Pearce read a short paper in which he said that live stock should be fed and watered well, and harness should be kept clean. He believed in frequent small feeds for horses, and one man should, where possible, attend them always. When weaning foals they should be fed on chaff, hay, bran, and small quantities of oats. As regards implements, he did not favor the purchase of large unwieldy machines. Woodwork should be painted at frequent intervals, and in wet weather nuts should be slackened. Ironwork could, with advantage, be given a coat of paint to prevent rusting. The respective advantages of working abreast or tandem was discussed. Most members preferred the tandem.

Willowie, August 4.

PRESENT.—Messrs. T. Hawke (chair), E. J. Kentish, S. C. and W. R. Greig, Schmidt, D. L. S. and I. McCallum, Rogers, Bristow, Stone, Bull, Foulis (Hon. Sec.), and six visitors.

COMMENCING FARMING.—Mr. Hawke read the following paper on this subject:—

"There are several methods by which a man may make a start farming, and, given favorable circumstances, may succeed. If there be sufficient capital to start with, undoubtedly the place to start is on new country, either on perpetual lease or under covenant to purchase; but where the capital is lacking, or at best limited, the system of share farming commends itself to my judgment as being the most rational, and as holding out the best prospect of success. I cannot see how (as has been stated in the discussions on this subject and reported in the *Journal*) a farmer is going to start in, say, mallee country with not more than £100, and have any reasonable hope of success for a good many years, unless he gets more good fortune than falls to the lot of the average man. Personally, I would not think of going into that class of country unless I had at least £200; and that, in addition to the help to be had under the Advances to Settlers Act, would be only sufficient to make a very modest beginning. Under the share system, however, a man with £200 in hard cash, and a good name to back it up, can reasonably expect to get well off the mark the first season, barring adverse circumstances, such as drought or other difficulties over which he can have no control. I take it that 16 bullocks and a five-furrow plough will turn over 200 acres in an average fallowing season. This will occupy, say, 10 weeks. Allow another four weeks for skimming or scarifying or otherwise reworking, and we have 14 weeks' work in preparing the fallow. This means that by the middle of October—if a start has been made at the beginning of July—the land should be in condition to lie over the summer. The share farmer can now take on any other work of a light character that may be had, simply to keep his cattle in condition for wheat-carting, when he has an opportunity of increasing his working capital—probably making enough to purchase three medium horses for drilling in his first crop, and to pay for the hire or purchase of a second-hand drill. He has his cattle to work the

land at seeding time to prepare the seed bed, and three horses will drill it in about three weeks. So that by starting his cultivating about the middle of March, the seed should be all in by the end of May. Here, again, there is an interval of a month, when other work may be engaged in as opportunity offers. The fallowing and cultivating again occupies 14 weeks, and by the middle of November harvesting will claim his attention. This should be finished and the crop carted by the end of January, or soon after; so that we find the programme works out approximately as follows:—First year—July 1st to October 15th, fallowing: interval of five months. March 15th to May 31st, seeding; interval of one month. July 1st to October 15th, again fallowing: interval one month. November 15th to January 31st, harvest and carting; followed by interval of six weeks before seeding commences again, and so on. I have stated these periods to show that during the year the share-farmer has about 14 weeks interval from his farming, during which time he has a chance of picking up odd jobs on the road, and so increasing his working capital. Now, suppose we start with the strength before mentioned. The 16 bullocks and tackling will cost (at £8 per head) £128. This amount could be reduced a little if, say, six steers were bought at £6 and broken in. Three £15-horses will do the drilling as well as £40 animals = £45: second-hand drill, £20; 2 tons super., £10 = £200. hire of plough and skimmer, say, £5: hire of wagon for wheat-carting, say, £15; total, £220. Given a fair average season, the first year he should clear £50 on the wheat-carting season, which will reduce the above amount to £170, and this, I think, is about the minimum if a man is to do much for himself. A fair average season should give a return of four bags per acre, which means 400 bags as the share-farmer's share, at 3s. 4d. per bushel, £200. Deduct from this for living and incidental expenses £50, and we have £150 as the net return. This, of course, would be much higher in a favorable season. Equally there is a probability of it being much lower in a droughty year. Bear in mind that the share-farmer has nothing to provide except his half of the super. that may be used, in addition to his labor and the necessary power; so that all he makes over and above his living and incidental expenses is clear profit. The above figures might be improved on somewhat if the necessary cattle, whether bullocks or horses, were bought on terms, and disposed of at a profit, as may occasionally be done. Compare this with the lot of a mallee settler. He has his instalment to pay for a start. Then, in addition to providing his own labor and the power and implements, he has to fence, provide for water for both domestic use and cattle, provide all his own seed and manure, and only get a start seeding after he has more or less laboriously and expensively cleared the patch of land that he will be able to crop the first season. By all means go on the new land under the Government if there is sufficient capital, but to get a start to provide that capital, in my opinion, share-farming offers the most promising opportunities." The same subject was dealt with by Mr. Kentish in a paper to the following effect:—"There are two distinct classes of young men who desire to become farmers. In the first place there are lads who grow up on farms whose parents buy farms for them, or who become security for them, and thus back them till they get a footing. Where this is done for any young man who has served his seven years at the work should succeed in getting on in any country. In the second place there is a far more numerous class of young men who desire to start farming, and who have nothing but their Savings Bank account as capital and the asset of their own efforts and capabilities—men who practically stand alone. This class is in the majority in this country. Speaking generally, we cannot congratulate ourselves that the outlook is a very cheering one for the average young man of this class. The case is not hopeless by any means, but it is slow work. At 26 years of age he will have from £300 to £400. In association with a good number of this class I have found this is about an average. I would advise young men of this class to try new country if possible. To-day there is a reasonably good outlook in districts now being opened up. In starting farming keep within the limits of your finance. If you have £500, do not undertake more than you could cover with £400. I am quite aware that plungers of late years have scored, but some of us can remember when they did very badly, and personally I think it is better to be able to cover comfortably whatever you take on. In buying new machinery it is always wise to get the best procurable. Opinions differ about what is best, but it is a mistake every time to buy machines because they are cheapest. Buying machinery on time-payment system—with interest charged on the outstanding account, as is customary—is ruinous." In the discussion which followed the majority of farmers favored the share system, until sufficient capital was raised to go on to new country. Mr. S. Greig thought it advisable to apply for land as soon as one was in a position to start on the share system, as one had generally a difficulty in securing land. Mr. Greig cautioned farmers against borrowing money to commence operations. Mr. McCallum recommended the laying out of a plan to cover operations

three or four months ahead, and so obviate loss of time in changing from one job to another. Mr. D. McCallum considered it advisable to go out into new country, such as Pinnaroo and Eyre's Peninsula, to start, as farming could be carried on with less capital there, and life was more free.

Wilmington, August 10.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. George (chair), Slee, Litchfield, W., J., and G. Schuppan, Zimmerman, Hoskins, Farrell, E. J. and A. Gloede, Noll, Hill, George, and Jericho (Hon. Sec.).

MARKETING FARMERS' CLIPS.—Mr. Farrell read the following paper on this subject:—
 "The farmer who keeps his few hundred sheep should not fall into the error of thinking that his small amount of wool is not worth much attention. Too often the sheep on the farm and their wool get very little attention. This should not be. Those few hundreds are as worthy of care by the owner as the thousands are by the squatter. In fact the farmer loses more in proportion than the large owner, because, even if the farmer's clip is carefully got up it will not command the same attention from buyers as the larger lots do; whereas, if badly got up, it will bring far below its real value. It pays the farmer to take time and care with the get-up of his clip. Sometimes we hear of a farmer who has bundled all his wool in together and has got more for it than his neighbor who has gone to some trouble to get his up in a proper manner. Be quite certain that there is a reason for this. Buyers know what they are doing and are not going to pay for dirt. The one wool may have been much heavier in condition, carrying more yolk, or sand, or other foreign substances, thus accounting for a big difference in clean wool, after scouring, to the woolbuyer. I do not advocate the employment of a skilled classer, but the farmer should use his common sense in skirting and rolling. Any man must see that the better it is done the more attention the wool will command. In skirting and rolling one of the most important things is to first have a clean place for the shearing, away from all danger of chaff and suchlike foreign matter getting mixed with the wool. The fleeces should be all skirted regularly, all dirt taken off, and the pieces put on one side. These should then be gone over again and divided into first and second pieces and locks, or, if thought better, only into pieces and locks. The fleeces should be rolled neatly from the breech to the shoulder, care being taken to make them look as bright and attractive as possible. Do not tie them with twine. Bellies, pieces, and locks should all be packed separately, as they are three distinct classes of wool. It is impossible to get full value if these are all mixed together. Where there is only a little of each they should be packed in bags and thus sent to market. The fleeces should be packed evenly in the bales, made to look neat, well sown, and should not be too heavy. The bales should be branded legibly and neatly and numbered consecutively from the first to the last of the clip. In discussing the subject, Mr. Noll said the price of wool was not determined by the get-up of the clip, but he fully agreed that all wool should be properly classed, and pointed out that a good shearer was always preferable to a second-rate one. Members agreed that it was advisable to keep sheep as quiet as possible, and that good feed was essential. These two features combined explained why pet sheep, in most cases, cut a heavier and better clip.

MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

Appila-Yarrowie, August 9.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. Francis (chair), Powell, Daly, Bottrill, Klemm, Catford, J. W. and R. Lines, Wurst, Becker, Boehm, Borgas, and Heaslip (Hon. Sec.).

DEEP WOUNDS IN HORSES.—Considerable discussion took place respecting the best means of treating deep wounds in horses. Mr. Bottrill had found that Stockholm tar poured into the wound, with a little dry lime sprinkled on afterwards, was a very good remedy. Mr. Lines used a mixture of one part carbolic acid with five parts olive oil with success. Mr. Powell recommended the use of arnicated oil; this remedy also kept the wound clean.

Beetaloo Valley, August 7.

PRESENT.—Messrs. A. H. Jacobi (chair), Burton, Thyer, Curtin, Bertram, Ryan, Cox, Jensen, Woolford, Hamilton, Bertram (Hon. Sec.), and two visitors.

PEACH-GROWING.—Mr. Ryan read the following paper on this subject:—"For the cultivation of peach trees it is best to have sandy soil about 2ft. deep, with clay subsoil or a black soil. It should be well worked and, if possible, worked a season before planting the trees. The best time for planting is about the end of June, or after a heavy rain. In planting, every care should be taken that all roots are spread out and all broken roots cut off before planting. All stones should be taken out of the holes in case they bruise the roots when pressing the tree, as the soil around the tree should be well pressed. It is always advisable to get trees from a good nurseryman, and plant two-year old trees. They should be grafted on good peach stock, and planted in holes about 1½ft. deep and 18in. to 2ft. square. Leave graft about 2in. above the surface. When pruning a young tree the main point is to develop a good shape, especially the first year. The tree should be cut back to about two buds on each branch. For the first three or four years pruning should be fairly hard, to make a strong tree before it starts bearing. It is advisable to prune all rank growth and give the tree sun and light. Each year, as it gets older, encourage six to eight leaders; cut back laterals to about four to six fruit buds, if left too long they are apt to break the tree when there is a heavy crop. All pruning of early varieties of peach should be left until the tree is out in bloom. Later varieties should be pruned about the end of July. For the first year the tree need not be dug around, but the ground just loosened up with a prong hoe, as digging round may destroy the young roots. If the tree is bearing a heavy crop, the fruit should be thinned to about 4in. to 6in. apart. For early varieties I prefer Brigg's Red May, High's Early Canada, Alexander's Early, Wilder, Dowling, Wiggin's Trump, Hale's Early; for later varieties the following are very good—Mountain Rose, Early Crawford, Elberta, Louis Grognet, Sea Eagle, Lady Palmerston, Camden Golden. I have found these varieties very suitable for this district." Members generally agreed with the views expressed in the paper.

Caltowie, August 5.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Hewett (chair), J. and G. Lehmann, G. Petitz, Graham, Neate, Amey, Collins, Williams, Wilsdon, and F. Lehmann (Hon. Sec.).

THE SHOW AND THE BREEDING HORSE.—Mr. Lehmann read an article from the *Garden and Field*, the tenor of which was that the fact of a horse being a show animal and kept in show condition did not affect its usefulness as a breeder. Members agreed that the fact of an animal being shown implied the possession of special qualities, but it was not lost sight of that frequently the show animal was so pampered that its natural vigor and procreative powers were considerably impaired. This was clearly shown by the fact that very fat show horses had proportionately few foals, and very frequently their progeny was of sluggish and weak constitution. It was thought necessary that young horses, in order to leave good stock, should have plenty of natural food and exercise.

COLIC IN HORSES.—An extract dealing with this subject was read by Mr. F. Neate. Some members thought horses could adapt themselves to different conditions of feeding and watering, and some thought it advisable to water their horses after feeding.

Georgetown, August 21.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. P. Higgins (chair), McAuley, G. and W. Hill, McDonald, Fogarty, Bond, Freebairn, Myatt, W. and A. Thomson, J. Higgins, V. Hill, Eyre (Hon. Sec.), and eight visitors.

DRAUGHT HORSE BREEDING.—Mr. W. A. Hill read the following paper on this subject:—"No farmer should have to buy horses to work; but, on the other hand, should have a few young colts to sell every year. To begin with, it is necessary to secure the service of first-class sires, and by all means see that they are well bred, and possess size, style, conformation, and quality. The better bred the animal is the more satisfactory the results will be. By doing this we raise a colt that is in demand at a good price, and it costs no more to raise than an inferior animal. No factor is more essential to successful

breeding than a suitable condition on the part of the brood mare at mating time. Inattention to this important requirement probably is responsible for quite as many disappointments in getting foals as any other of the various causes which are liable to cause barrenness. Some mares will breed readily enough whatever condition they are in, but that is far from the case with the great majority. Too often when a mare fails to breed the fault is ascribed to the stallion, whereas in reality it lies more with the breeder for failing to have the mare in proper trim for breeding. For breeding purposes a mare requires to be in just a nice, natural, thriving condition. Brood mares should always be given a reasonable amount of suitable work right up to within a few days of foaling. They should not be harnessed to heavy loaded wagons, or attached to a plough in rough, stony ground. It is found that light work is beneficial and keeps them in right condition to foal with the least trouble. It is a wise plan to keep the mare apart when she is expected to foal, as otherwise the other horses may rush after the foal and cause a broken limb or some other injury. After foaling they should be kept in a good paddock, as it is most important for the foal to have a good start. If it is not cared for and fed well it will never make a good horse. Foals should be weaned at about six months old, and care should be taken to feed well at this time. In our district it is a wise plan to stable them through the cold weather and turn them out as it gets warmer and there is some strength in the green feed." The writer then described at considerable length the various parts of a horse, and indicated the points to be looked for in the perfectly formed animal. In discussing the subject, members generally favored breeding from best stallions, but results were not considered satisfactory owing to the show stallions being kept too fat. It would be a decided improvement if judges did not approve of overloading the horse with fat.

Mount Bryan, August 14.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. Hatherly (chair), Wardle, Thomas, Tralaggan, Collins, Casaratto, Stewart, Price, and Hatherly (Hon. Sec.).

CARE OF FARM IMPLEMENTS.—Considerable discussion took place on this subject. Members agreed that all machinery and implements should be put under cover, and that they should have a coat of paint, after having been overhauled, when the busiest part of the season was over.

Mount Bryan East, August 5.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. J. Thomas, jun. (chair), B. and W. Dunstan, Tralaggan, R. Thomas, Doyle, W. and T. Quinn (Hon. Sec.), and one visitor.

WOOLSHEDS.—Mr. C. W. Gare contributed a short paper on this subject. He said careful handling was essential to wool, and in order that it might be properly classed a shed was necessary. Plenty of room was required for sweating pens. These should be well up off the ground in order to provide abundant ventilation. The board should be 8ft. wide, and should be boarded up 4ft., so that the sheep could not see the shearers whilst they were being yarded. Catch-pens should hold about enough sheep for one run. The battening should be about 3in. by 1in, set down ½ in. apart. The wool table should be set so that the wool roller could get all around it. A good table could be made with broom-handles. In discussing the subject, some members thought 3in. was too wide for battens.

Port Germein, August 12.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Carmichael (chair), Deer, Holman, Blessing, Hacket, Turner, Glasson, Stone, Head, and Stock (Hon. Sec.).

HOW TO MAKE FARM LIFE ATTRACTIVE TO BOYS AND GIRLS.—Mr. Blessing read the following paper:—"Only recently it was stated in the public press that 45 per cent. of the entire population of South Australia were living within a radius of 10 miles of the General Post Office in Adelaide. When we consider the size and extent of our State, this seems almost impossible, and such a condition cannot be for the benefit and advancement of our country—as South Australia's success and prosperity will always depend upon primary production. Obviously there are many reasons why young people do not

like farm and country life, and prefer the metropolis, with its higher wages, shorter hours of work, and, above all, more pleasure and enjoyment—although as far as the higher wages are concerned, a young fellow will save more money during the year on a farm at 20s. or 25s. per week than he will with £2 or £3 a week in town, and in addition have better health. In many cases it is the fault of the parents that the boys and girls when they get to manhood and womanhood do not stay at home on the farm. They scarcely ever see a shilling they can call their own, or get time to see or play a game of cricket or football, or attend any other amusement. In my opinion there is no better way of making boys and girls contented at home, and getting their best from them, than to give them a pecuniary interest in the farm—either in the way of a certain percentage in the profits or all the produce from a particular piece of ground—and the girls can also share in the profits of the dairy and poultry or other industry they may be engaged in. Above all, when they have money, teach them to make the best use of it by opening an account with the Savings Bank, or investing it in some other reproductive concern. Depend upon it, the boy or girl that has got a deposit at the Savings Bank at 16 or 17 years of age will never be an applicant for an old age pension. Again, most boys and girls have a hobby of some sort. Encourage that hobby, even if it is unprofitable at first. Boys generally have a liking for some particular handicraft—such as blacksmithing or carpentering, &c. Provide them with the necessary tools, and it is surprising how quickly they will become proficient in mending and repairing breakages on the farm. The money spent on tools and material will soon be repaid, for it is not always the cost of repairing, but the time lost in going to a tradesman, where the greatest saving comes in. Then again, get the boys and girls interested in our country shows and industrial exhibitions; encourage them to compete, for friendly rivalry is a great stimulant, and will create a love for rural life and occupation. Above all, provide the home with good and healthy literature."

ANNUAL MEETING.—The Chairman briefly reviewed the operations of the Branch during the 12 months. He thought the Branch had not made the best possible progress. He suggested drawing up, say, a three months' programme, and choosing two members taking them alphabetically, to be responsible for each meeting. Messrs. Deer, Holman, and Blessing agreed with the Chairman's suggestion. They did not think the Bureau meetings had been fruitless, as they had each received much benefit from attending.

Port Pirie, July 1.

(Average annual rainfall, 12·3in.)

PRESENT.—Messrs. Munday (chair), Eagle, Welch, Greig, Jose, H. and H. M. Lawrie, Birks, McEwin, Hawkins, Hector and Wright (Hon. Sec.).

SHELTER FOR FARM STOCK.—Mr. Welch read a paper on this subject. He said a straw stack was a most suitable shelter for horses in the winter, as in addition to shelter they got some dry food from it. Cows would not yield a good flow of milk if not properly protected from the weather. For working horses there should be a good stable, closed at both ends and at the back, with a yard large enough to allow of their lying down. Plantations of trees about the farm were beneficial both for winter and summer protection. Stock well protected did not require the amount of food that they would otherwise need. Pig sties should have a straw roof that would keep out the rain and would protect the pigs from the heat of the sun. Sheep, as a rule, did not require shelter, but when ewes were lambing in winter they did better in a paddock with brush to shield the lambs from cold winds. In the discussion which followed, Mr. Hector said that trees were necessary to shelter stock. Animals required less water when protected from the sun. When sheep were sheltered the wool was much improved. He had found it difficult to grow trees owing to the prevalence of rabbits. It was necessary to fence in young trees. A grass stack kept for the winter afforded good shelter. Mr. Greig said that various trees were very valuable for summer shelter, but for winter he preferred the straw stack. Mr. Birks emphasized the importance of having good shelter for sheep. Many lambs, although strong and healthy when dropped, died as the result of sudden exposure. This would be obviated if lambs and ewes were provided with suitable shelter. He had noticed that sheep preferred the heat of the broiling sun rather than the shade of sandalwood trees. The reason was that swarms of ants were to be found under these trees. Mr. McEwin thought a straw stack of special value where cows were kept, as they required dry feed as well as the natural feed of the paddocks during the winter months. Mr. Hawkins said horses did not require so much grooming, and they thrived better generally when they had access to the straw stack. The Chairman said that when land was cleared of its natural

shelter, it became more liable to frosts, &c. It was a difficult and an expensive matter to grow trees in the open country after all other timber had been destroyed. He preferred housing his stock during the winter months. A better percentage of lambs would be obtained where the ewes had good shelter.

Port Pirie, August 5.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. W. Munday (chair), Welch, Hawkins, McEwin, Jose, Johns, Laurie, Eagle, Birks, Greig, Wright (Hon. Sec.), and one visitor.

IMPROVED METHODS OF AGRICULTURE.—Mr. Munday read a paper on this subject. Having traced the evolution of farm implements and machinery from the very crude and cumbersome appliances which preceded the present day farm plant, the paper continued—"The methods of cultivation generally adopted to-day by the practical farmer are a vast improvement on the system generally in vogue 30 years ago. Then, the most that was deemed necessary in the way of cultivation and preparation of the soil for the seed was merely ploughing, with an occasional harrowing, after the broadcast seed sower. The question of moisture conservation, fallowing, thorough cultivation of the soil, drilling in and manuring the soil under the one operation, were factors undreamt of in those earlier days, the practice generally being to clear the land of timber and other obstructions, crop to wheat three or four years in succession with more or less satisfactory results—generally less—then leave the land out for a year or two, plough and again follow with wheat. Very little stock was kept upon the farm, except those really necessary for the work of the farm. To-day we find a small flock of sheep upon practically every farm of any magnitude, also a more diversified system of cropping in rotation—grain, pasture, fallow—with here and there a rotation of fodder crops in the nature of rape, barley, oats, etc., as the case may be; thus making possible the rearing and fattening of lambs for local and export trade. The improved methods of agriculture are chiefly responsible for the large increase in our yearly average of grain. Whereas formerly, under the crude methods in vogue, a 6bush. or 8bush. average was considered a fair return, to-day, under improved methods, crops 20bush., 30bush., and in rare cases 40bush. per acre are reaped; while the average for the State has been raised to 12bush. and even 13bush. per acre during recent years. The dairying industry may be looked upon as being no mean factor in the success that has attended modern methods of agriculture, and it has largely added to the wealth of the individual and the State at large. These are a few of the many steps of progress during the past 30 years: but who will venture to predict the progress possible during the next 30 years. With the aid of science and a more intelligent system of farming, combined with a thorough knowledge of soil requirements and moisture conservation, with a better system of rotation of crops, and a continuance of profitable prices for farm products, I see no reason why the progress of the next 30 years should not be as great as that of the last 30 years, especially in view of an ever increasing population. Our aim must ever be onwards and upwards, always striving to keep in the van of progress." In discussing the subject, Mr. Greig said that the great drawback to the modern complete harvester was that it tended to dirty the land by distributing weed seeds about the paddocks. Mr. Birks agreed with the main points of the paper. In the early days only the very best of the land was brought under cultivation, and that probably accounted for good yields then. Only picked spots in the North were capable of carrying a payable crop of wheat year after year. Mr. McEwin had used the flail and sickle, and had ploughed with a single-furrow plough. In the early days a yield of from 60bush. to 60bush. of wheat per acre was sometimes obtained. New land cropped at the present time would not return anything like that yield. Mr. Johns agreed that virgin land treated under modern conditions would not return such good results as it would have given in the early days. It was probable that the cause was due to altered climatic conditions, or perhaps certain qualities had been taken from the soil by grazing. The chairman, in replying to the criticisms, said that in spite of all improved methods which now existed, he doubted whether the farmers on the whole were any better off at the present time than they were 30 years ago. People were content to go slower under the crude conditions which prevailed at that time. Wages were much the same as at present, viz., from £1 to 30s., with board, &c. With reference to harvesters, he agreed that it was much easier to cope with the crop now than formerly, although they were the cause of fouling the land to a certain extent. Although great progress had been made in regard to labor-saving appliances of late years, it appeared to be only a matter of a transference from the farm to the workshop, resulting in more profit to the manufacturer than the farmer.

Redhill, August 8.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. F. Wheaton (chair), Dunsford, Cox, Coffee, Steele, P. H. Wheaton, Prevost, Potts, F. A. Wheaton (Hon. Sec.), and three visitors.

IMPROVING BRANCH MEETINGS.—Mr. Coffee submitted a paper on this subject:—At the outset the writer said that much of the prosperity experienced during the past 10 or 15 years had been due to the use of superphosphate and the scientific treatment of the soil. In the future it would become necessary to win greater returns per acre from the land. The Agricultural Bureau here proved of great value. In its meetings by means of friendly argument and debate the reasons for certain experiment and the results obtained were thoroughly discussed. Unfortunately, producers in some districts were not enthusiastic regarding the work of the Agricultural Bureau, and its meetings were consequently not well attended. The following suggestions for improvement were then submitted:—At the first meeting of the session let the secretary have a list prepared of suitable and seasonable subjects, and call for volunteers to take up the different subjects. By adopting this method an improvement will be effected in two ways. The members will be able to select some subject with which they are familiar, and will have ample time to read themselves up on the matter, and the other members will be enabled to prepare a case for the opposition. Establish the "question box," to which the general public may be allowed access. At the meeting when the box is opened don't have any discussion, Call for volunteers to take the different questions asked, and have an answer ready by next meeting. By this means more reliable answers may reasonably be expected. Of course, it is quite open to any member other than the one who volunteers to look the matter up, and if the answer given is not in accordance with his ideas he can state his views on the subject. Homestead meetings to be encouraged wherever practicable. Let all members make a practice of carrying a note-book and pencil, and when met with anything of a puzzling nature make a note of it and bring the matter forward at the next meeting. What may appear a conundrum to you may possibly be explained by some other member. I would suggest that £50 be voted by the Government and offered in, say, three prizes for the purpose of encouraging good healthy competition amongst the Bureau members. All papers written by members after being read and discussed by the Branch, to be forwarded on to the head office. From amongst the Advisory Board let three judges adjudicate upon the merits of the different papers submitted, and award the prizes accordingly. This proposal, if carried out, would, I feel sure, improve the quality of the papers written. It might be truthfully said that some hundreds of painstaking farmers would have no possible chance of securing the one or two prizes mentioned, and to give every Branch in the State an inducement to experiment and to study, I submit the following recommendation—let every Branch introduce the ballot box. At the end of each meeting each member present to be given a slip of paper, and on this he records the name of the member who, in his opinion, advanced the best and soundest arguments at that meeting. The papers are placed in the box, and left there until the end of the session. Then, in the presence of the members, the votes are taken out and counted, and the member who gains the most votes is adjudged the winner.

Whyte-Yarcowie, August 7.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Lock (chair), Walsh, Wittwer, Gregor, Robinson, Hunt, McLeod, Travers, Pearce, Faulkner, Pascoe, Mudge, Pearce (Acting Hon. Sec.), and five visitors.

Messrs. Fowler, Battersby, and Schmidt, delegates from the Yongala Vale Branch, were present at this meeting.

LOCAL VETERINARY ATTENDANCE.—Mr. Fowler introduced the subject of procuring the services of a qualified veterinary surgeon for the district. Mr. Battersby had tried local men who were unqualified, and now considered that unless a man could procure a qualified surgeon, sick stock were best left alone. He considered it the duty of the Government to appoint veterinary surgeons for country districts. Mr. Wittwer also thought the Government should appoint veterinaries, but that they should charge fees.

Yongala Vale, July 29.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. Cooper (chair), Buttersby, J. and P. Chigwidden, C. and E. Fowler, H. Miller, Scott, Keatley, Schmidt (Hon. Sec.), and one visitor.

TILLAGE OF THE SOIL.—Mr. Menz read a paper, in which he pointed out that it was most important to keep the land free from weeds if wheat-growing was to be carried on successfully. Much of the land in this district was very dirty when it was allotted, and consequently a great amount of work was put on the shoulders of those who took up the land; also the floodwaters had no outlet, and in sweeping over a vast area of level ground the seeds of the weeds were scattered far and wide. He favored early fallowing to a depth of 5in., and harrowing the land well after the ploughing, so as to get an even surface, in which a cultivator would do better work; besides, if the land was worked finely it would help to conserve the moisture in the soil. After the weeds had come up again the cultivator should be used, and those which the cultivator had not pulled up should be brought up with the harrows. On stubble land he would use the skim plough as soon as the stubble was burnt off and plough to a shallow depth; this would cover the seeds of the weeds lightly, and a shower of rain would soon cause them to germinate. When they were well advanced a cultivator would easily exterminate them, especially if it was followed by the harrows. In the discussion which followed members agreed that no hard and fast rule could be laid down with regard to depth of ploughing. This could only be determined by studying the nature and condition of the soil of the district. Members also thought that it was a wise plan to plough shallow at first, especially new land, and to experiment by gradually ploughing deeper.

Yongala Vale, August 19.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. Lloyd (chair), F. and H. Miller, Buttersby, J. and P. Chigwidden, Simon, Daly, C. and E. Fowler, Cooper, Scott, W. and T. Keatley, Schmidt (Hon. Sec.), and four visitors.

VETERINARY SURGEON.—The question of obtaining a duly qualified veterinary surgeon for the northern districts of Yongala Vale, Terowie, Petersburg, Yarcowie, and Yongala was fully discussed, with the view of formulating a scheme by which the subject might be carried out successfully. Members were assisted in the above by representatives of the Yarcowie Branch. The subject had been discussed for some time, and it was resolved to ask the Members of Parliament for the district to approach the Government to station a qualified veterinary surgeon in a central part of the above-named districts; or, if a veterinary lodge be formed to obtain a qualified veterinary surgeon, to approach the Government to subsidise members' subscriptions £1 for £1.

CULTIVATION OF FALLOW.—Mr. E. Fowler read a paper on "Cultivation of Fallow" to the following effect:—As fallowing is one of the most important factors in the agricultural industry, great care should be taken with regard to depth of breaking up the land and to have the land as free of weeds as possible; the latter could easily be accomplished by placing sheep on the land to feed it down as bare as possible. Fallowing should be commenced as soon as the seeding is completed, because early fallow always proved to be the best; and in the case of stubble land he would rather burn the straw than plough it into the soil, for with burning, the straw not only was done away with, but the seeds of weeds were destroyed at the same time. The fallow should be left untouched for about two weeks, so as to let as much air as possible into the soil, and then it should be levelled down by harrowing crossways. In dealing with dirty land it was a good plan to postpone the harrowing until a good rain had fallen; the soil would then break up more readily and cover the seeds of weeds, which were thus given a good opportunity to germinate and grow at once. The harrows should be followed by the roller, so as to break up the clods thoroughly, and any seeds of weeds that may have been imbedded in them would then have an opportunity of germinating at once; otherwise they would be left to come on at a later period and cause extra work in their destruction. If the ground was harrowed only, the moisture would evaporate to a depth of 2in. or 3in., leaving the soil dry, and the seeds of weeds in that layer would be prevented from growing with the rest. After the weeds were well advanced the cultivator should be put to work, followed by harrowing and rolling as before, so that any seeds which were missed at first would have a further opportunity of growing. It may not always be convenient for a farmer to attend to the weeds when they are well advanced, but a few sheep on the fallow

will greatly assist to prevent their going to seed before they could be attended to. He thought September was a good month for this district for cultivating the fallow, but care should be taken to cultivate in dry weather, as otherwise the weeds would not be destroyed. On dirty land he would cultivate to a depth of 3in. or 4in., but to a lesser depth on clean land. He recommended cultivating the fallow to a shallow depth after the harvest was completed, and again before seeding time. He would always harrow after the cultivator, but not after the drill, unless the crop had been put in very late. A long discussion on the paper took place. Members were in favor of cross-cultivation, but differed in opinion as to whether the stubble should be burnt or ploughed into the soil. The majority were in favor of burning the stubble, as that method helped to destroy many seeds and weeds.

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

Blyth, August 8.

PRESENT.—Messrs. A. L. McEwin (chair), Zweek, Dunstone, Buzacott, Schuster, Gell, Lehmann, Shepherd, Longmire, A. A. and J. C. Schulze, Pratt, Roberts, Coleman, Pedler, J. S. McEwin, Best, H. W. and W. O. Eime (Hon. Sec.), and 36 visitors.

VETERINARY LECTURE.—Veterinary Surgeon Place, M.R.C.V.S., of the Stock Department, delivered a lecture, illustrated with lantern slides, on horses and their ailments; and also explained the benefits to be derived from the formation of horse-breeding societies.

Clare, August 4.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. D. McKenzie (chair), Victorsen, Radford, Tuohy, A. Lee, T. W. H. Lee, Pascoe, Nolan, Lloyd, Knappstein, Hill, Pryor, Menzie, Dux, Jarman, Kollosche, Pink, Kelly, Scott, Scales, Daly, Maynard, Keane, P. H. Knappstein (Hon. Sec.), and one visitor.

VETERINARY DEMONSTRATION AND LECTURE.—Mr. Place, M.R.C.V.S., of the Stock and Brands Department, conducted a *post-mortem* examination of a horse, explaining the functions of the important organs. In the evening Mr. Place delivered a lecture in the Town Hall on "Common Ailments in Stock and their Treatment." Both lecture and the *post-mortem* were much appreciated.

Gawler River, July 14.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. A. J. Bray (chair), A. M., J. H., and C. A. Dawkins, J. and B. Hillier, Roediger, Dunn, F. Bray (Hon. Sec.), and three visitors.

DESTRUCTION OF RABBITS.—Members did not greatly favor the use of the poison cart, as it destroyed many native birds, and also caused the death of stock through their eating the dead carcasses of rabbits. Mr. A. M. Dawkins explained the method of using carbide by dropping a small piece into a tin of water and then burying it in the burrows. Mr. Stone, a visitor, stated that the practice adopted in his district was to take a piece of carbide about the size of a pigeon's egg, wrap it in a piece of bagging, immerse for a few seconds in a bucket of water, and then throw it into the burrow, and immediately close up the latter. This method had proved more effective than the use of bi-sulphide of carbon.

Gawler River, August 28.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. A. J. Bray (chair), A. M., C. A., and J. H. Dawkins, C. Leak, Rice, Dunn, Hillier, Hayman, Roediger, Richter, Winckle, Davis, F. Bray (Hon. Sec.), and 20 visitors.

ARTIFICIAL FERTILISERS.—Mr. Hattrick, of Sydney, delivered an instructive lecture on the subject of "Artificial Fertilisers in relation to Farming and Fruit-growing." The producer needed to study how to get the best returns for the amount laid out in artificial fertiliser. In fruit-growing the results often equalled £1 for every 1s. laid out if spent in the right way. It was necessary to supply the soil with those substances which were lacking and yet essential to success. The principal substances removed were nitrogen, phosphoric acid, and potash. The lecturer exhibited a chart showing proportions of these elements which were used up by various cereals and fruits. As a general rule the application of nitrogen was unnecessary in Australia owing to the climatic conditions. The soils of Australia, wherever agriculture was carried on, were notably deficient in phosphoric acid, there being only a few limited areas where there was sufficient to ensure good crops with continued cropping. It was owing to this that the application of phosphoric acid in the form of superphosphate gave such satisfactory results. According to analysis there was sufficient potash in a good deal of South Australian soil to last for 100 years; but it was not wise to depend too largely on chemical analysis in finding out the true nature of the soil. The only way to find out what manures to apply to the soil was by actual experiment in the field. Mr. Hattrick, at the close of his lecture, threw a number of colored pictures on a screen with the aid of a lantern, showing the results of experiments with various fertilisers in the various States. In nearly every instance there was a marked increase where a complete fertiliser, viz., phosphoric acid, nitrogen, and potash, had been used in comparison with incomplete manures of only one or two of these elements. A number of questions were also asked by members and visitors and a good deal of information given.

Mallala, August 14.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. Griffiths (chair), Marshman, Temby, Worden, J. and A. V. Nairn, Jarroyn, Konzag, and Worden (Hon. Sec.).

HORSE-BREEDING SOCIETIES.—This subject was introduced by Mr. Marshman. Some members had not been very successful in their attempts to breed from imported stallions, having been able to get a better class of horse from local animals. The general opinion of members was that it was unwise to expect too great a change at once. As probably the dam side had been inferior for a considerable way back, it would take some time to raise the quality of the horse. It was decided to form a society, and a committee consisting of Messrs. F. M. Worden, J. Nairn, H. V. Nairn, F. A. W. Konzag, J. McLachlan, and S. Temby was appointed.

Nantawarra, August 9.

(Average annual rainfall, 15 in.)

PRESENT.—Messrs. Greenshields (chair), Nicholls, Sleep, Smith, Dixon, Herbert, Sutton, Sinclair, J. Nicholls, Uppill, Tucker (Hon. Sec.), and two visitors.

LAMB-RAISING v. WHEAT-GROWING.—This subject was dealt with in a paper by Mr. Nicholls. The results of experiments conducted in other parts of the world, he said, suggest to us the wisdom of considering the relative advantage of growing wheat when the market price is at 3s. per bushel and raising lambs saleable at 10s. per head. So far no actual experiments have been made over a number of years for the purpose of determining whether it would pay to cultivate land simply for feeding stock, and it has yet to be proved that the system adopted in this district, i.e., a combination of wheat-growing and lamb-raising, can be improved upon in the direction indicated above. Continuing, the paper said—"The treatment of the land in this district is almost universally bare fallow one year, a crop of wheat next year, and one year—the lambs' year—in stubble. What the indirect return from treating the land for wheat means to the lamb raiser is apparent to anyone who at this time of the year inspects the stubble paddocks and sees the rich, succulent herbage on which the lambs are running. Some are inclined to value too lightly the crop of feed the land grows after a crop of wheat, and we sometimes hear our method spoken of as one crop every three years, when it really means a rotation of crops—very bare fallow, a crop of wheat, followed by a crop of lambs, and splendid lambs, too, if properly cared for. We have this season a flock of lambs raised almost exclusively on virgin soil, and another flock that has been kept altogether on land on which wheat was grown last year. I may say that the first-named compare very unfavorably indeed with those fed on what we call the stubble paddocks. It would appear, however, that the wool from the ewes fed on the natural grasses is of rather better quality than that from those

feeding off land that has been cultivated. We often make a mistake in keeping too many lambs. There is no reason why our lambs should not be as fine as any in the world, but through having too many a slight check in the growth takes place, and mischief results that no amount of after feeding will ever overcome. We should not grow less wheat even at present prices, but we should make the country produce more and finer lambs. This might be done by following the system adopted with so much success at the Roseworthy College, i.e., giving the land heavier dressings of superphosphate. I know that many of our farmers are recognising this, and instead of applying a light dressing of 60lbs. or 70lbs. of super. per acre, they now put on not less than 10wt., and we believe that before many years have elapsed the quantity per acre will be still further increased. Briefly, to summarise, I am of the opinion that wheat in this district will still take first place, but that it will pay us handsomely to recognise the full importance of the lamb industry, and to leave nothing undone that will enhance the importance of this State as a large exporter of lambs of high quality."

In discussing the subject, Mr. Herbert said that if the owners of two ordinary sized farms were to devote the whole of their land for a term of say seven or eight years, one to wheat-growing and the other to lamb-raising, the wheat-growing would pay better. Mr. Sleep thought that at the prices mentioned wheat-growing would prove more profitable, but a combination would return better results, with which opinion Mr. Smith concurred. Mr. Nicholls remarked that it was advisable for members to keep to their present method until a better was presented to them. It had yet to be proved that it would pay to cultivate fodder for sheep. Some farmers used their ewes and lambs too much in cleaning fallow ground. He recognised the necessity of keeping the fallow clean; but his practice was to keep a flock of two-tooth wethers for this purpose.

Salisbury, August 8.

PRESENT.—Messrs. Moss (chair), Sayers, King, Coher, John, Ey, A. H. and A. J. Harvey, Heier, McNicol, Jenkins, Goodall, Frost, Whittlesea, Sexton, McGlashan, Short, James, Shepherdson, Ilman, Neal, Judd, Jefferies, Patterson, Hooper, Jenkins (Hon. Sec.), and five visitors.

HOW TO MAKE FARMING PAY.—Mr. James initiated a discussion on this subject. He was farming in the western districts of Victoria, and was more conversant with conditions there than in South Australia. With regard to farm stock, he believed in the farmer having plenty of good horses and up-to-date machinery. He favored cropping during April and early May, fallowing early, and harrowing up fairly close. Where the acreage was sufficient he would breed horses and keep sheep. The results from graded wheat hardly justified the extra trouble. He had secured best results from sowing $\frac{1}{2}$ bush. with 80lbs. manure to the acre. The wheat stood well, and he had counted 134 stools from one grain. Strippers and treadle winnowers were preferable to harvesters as the latter tended to dirty the land. In 1907, with an 8in. rainfall, he averaged 16bush. to the acre on fallow land. He had found burning the stubble had checked takeall. Ploughing in stubble harbored grubs. Poultry and cows were very valuable assets to the farmer. Mr. Neal said unmanured crops were better in dry seasons on limestone land, and they would not blight off. Mr. Short would not keep more horses on small holdings than was necessary. He would not harrow immediately after ploughing, as the ground had a tendency to set hard. He found takeall was more prevalent on land that had been left out for a few years. Mr. Inman would not harrow directly after ploughing. Mr. Moss suggested that as manure forced crops, in dry seasons the available moisture was more quickly consumed, and consequently the crops burned off more rapidly than those not manured.

YORKE PENINSULA DISTRICT. (TO BUTE.)

Arthurton, August 14.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Rowe (chair), Short, Williams, Klein, Page, Bull, Elix, Crosby, Collier, Lampshed.

HOMESTEAD MEETING.—The meeting was held in the homestead of Mr. G. Bull.

FARMYARD MANURE.—Mr. Rowe contributed a short paper on this subject. He said insufficient attention was paid to the manure from the stables. In too many instances it was either ignored altogether, or carted into a paddock and there dumped in cartloads, with the result that the crop grew so rank on these patches that stock would not eat it. He thought, when properly handled, it was a better and cheaper fertiliser than phosphate. The method he had adopted in dealing with it was as follows :—When horses were being stabled the stalls were cleaned out twice or three times a week. The manure was carted from the stables and spread in the paddock direct from the dray, each time a strip the full length of the paddock and of a width that could be covered from the dray being done. The manure was spread evenly but not thickly. He was working three paddocks, each year manuring the one which it was intended to fallow the following year. Fallowing helped to work the manure into the soil. Spreading manure in this manner had given him results equal to those obtained from an application of 80lbs. of super.

Maitland, August 10.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. Opie (chair), Bawden, Bentley, Hill, Smith, and Pitcher (Hon. Sec.).

SHIPPING WHEAT IN BULK.—The following paper on this subject was read :—“ A system of elevators, or shipping wheat in bulk, would not be of great service to the farmers in South Australia. In the first place the Government would be put to great expense to construct buildings and equip them with the necessary machinery. There is not sufficient wheat grown in the State to warrant such outlay as would be required. Every railway station of any importance would require an elevator on a small scale, and all rail wagons that carried grain would require to be specially constructed. Farmers would still have the expense of bags. Supposing he delivered his wheat to the nearest elevator, and took his bags back home with him, how many times could he use them before they would require repairs? Personally, I should not like using the bags the second year. The majority of farmers would require the same number of bags that they use now, especially where harvesters are used entirely. Very few farmers are in a position to keep one or more teams carting wheat during harvesting, and it is a certainty that they cannot hire teams or men to drive them. I recognise the fact that we if had elevators it would tend to give Australian wheats a better name in the world's markets, as it would be perfectly clean and thoroughly graded. It would mean certainly the loss of a charter for at least three or four large vessels, as the offal would be left in the State. Of course, the saving of the freight on this rubbish would be credited to the use of elevators. No doubt the time will arrive when elevators will become general in the State, but the distance from the world's market is detrimental to conveying grain thereto in bulk. No doubt science will advance in the art of shipbuilding so as to enable cargoes in bulk to be carried under any conditions in safety. When that happens insurance should not be more for bulk than otherwise. Factors in Mark Lane believe that wheat in bags commands a higher price than in bulk, and some corn merchants consider there is more danger from weevil and natural heating when transported in bulk.” In discussing the subject Mr. Hill said he would like to see the elevator system adopted, as it would be a decided benefit if all wheat was graded before it left the State; then farmers could keep all the rubbish at home. Mr. Opie also favored the elevator system.

Minlaton, August 12.

(Average annual rainfall, 17 in.)

PRESENT.—Messrs. Correll (chair), Boundy, Anderson, Giles, Page, and McKenzie (Hon. Sec.).

HORSES v. MOTIVE POWER.—Mr. Anderson contributed a paper on this subject. He dealt with the likelihood of the horse being superseded by the motor for farm traction purposes. Whilst a traction engine could be purchased at about a cost equal to that of a team of 10 horses at the present, the fact must not be overlooked that the value of the former depreciated very considerably while, with an average of two foals per annum from the horse team, its value would be enhanced rather than depreciated. He favored the pure bred Suffolk Punch for farm work. Considerable trouble was caused the farmer by the contraction of sore shoulders by the horses. He attributed a great deal of this to turning without lifting the plough. A galvanized spring steel collar was the best preventive

he had found. With regard to horses for driving purposes, he thought a pair of 13 to 14 hand ponies were better than one horse. Members did not think tractors were likely to displace the farm horse to any great extent for some considerable time yet to come. For most work on the farm a good Clydesdale was to be preferred.

WESTERN DISTRICT.

Cummins, July 8.

PRESENT.—Messrs. Sabey (chair), Johnson, Cooper, Hall, Norsworthy, Hancock, Johnson, Durden (Hon. Sec.), and one visitor.

BREEDING AND HANDLING HORSES.—Mr. Johnson contributed a paper on this subject. Having described the outstanding points of a good horse he proceeded to say that mares for breeding purposes should be at least three or four years old. Early breeding was detrimental to the proper development of the mare. As regards disposition, the mare exercised a very considerable influence on her offspring, so care should be taken in selection of brood mares. The mare's hips should be long, oval, and broad; the hock joint should be well formed and not of the cow-hocked or sickle-hocked kind. The most important factor in the management of horses was to teach them confidence in man. Mouthing should be done with the aid of a halter and a straight bit, which could be put on the colt when he was loose in the stable. When this had been on for half a day a rein should be put in each ring, and with a man on each rein the colt could be driven round for, say, half an hour per day for a few days. When the animal had become thoroughly used to this he could be put into some light implement with quiet, staunch horses. Mr. Norsworthy stated that he never mouthed a young horse much before he put it in a team, but Mr. Johnson said the more one handled and mouthed a colt the better and safer he would be in a team.

Elbow Hill, August 12.

PRESENT.—Messrs. Cooper (chair), Wake, Rehn, Styles, Morgan, Wheeler, Chilman, Williams, Wake (Hon. Sec.), and two visitors.

SORE SHOULDERS.—Mr. E. Wake read a paper, in which he pointed out this trouble could to a very considerable extent be obviated by the use of well-fitting collars and hames. When the horse was pulling from a low draft, the pull from the hames should be high, and *vice versa*. Special care should be taken of the shoulders of colts when breaking, as they were very susceptible to sore shoulders, and once they developed great trouble and inconvenience was caused. The most suitable remedy he knew of was to turn the horse out until the shoulders were better, and then put him to work in a new hair-faced collar. Collars that had been padded too often became heavy and close, and caused the horse to sweat more. This naturally made the shoulders blister, and develop into sores if not immediately treated. When this happened he mixed a soft lard or mutton fat with kerosine, which was applied just prior to putting the collars on and directly they were taken off. Horses' shoulders breaking out he attributed to overfeeding with corn. In discussing the paper, Mr. Styles said horses should be lightly worked prior to the busy season, and then with due care no trouble need ensue. He did not think new collars were best. Mr. Chilman had used gall cure as a preventive, and Mr. Wheeler advocated the use of hair-faced collars. Mr. Rehn said the use of the spring draught plough would obviate the trouble. The Chairman thought the best means of preventing sore shoulders was to soak a new collar in water before using. When put on the horse it would stretch to fit. The Hon. Secretary said gall cure caused hard humps on the shoulders.

Green Patch, August 14.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. Gore (chair), Sinclair (senior and junior), Merchant, Chapman, McFarlane, Whillas (Hon. Sec.), and one visitor.

LAND DRAINAGE.—Mr. Merchant read a paper on this subject. He said, in reference to the Port Lincoln district there was not a farm but that would be benefited by drainage. He favored the underground drains as against the open. The latter cause a considerable amount of waste, time, and trouble, and were a great obstruction to proper working. In addition, the water running off the land into the drain carried with it a deal of fertilising matter. The most satisfactory system was the underground drain constructed of earthenware pipes. Drains of this nature caused a freer circulation of air in the soil. When timber was used for underground draining, well-matured sugar gums sawn into blocks 18in. to 20in. long, and split into slabs about 2in. thick, were most suitable. Stringybark saplings could be used for laying lengthways. Young timber should not be used, as it rotted too soon. He had made drains without timber to rest the slabs on, leaving two ledges for this purpose; but it was found that the ledges collapsed, and left the slabs without support. Thirty years ago he had made stone drains. The channel was dug to a depth of 3ft., into which a quantity of broken metal was put. Grass and rubbish was placed in the metal, and the drains have acted effectively ever since. In reply to a question as to whether stones larger than 3in. gauge would be suitable, Mr. Merchant replied that experience taught that the drains were liable to choke if larger stones were used. The width of drains should be about the width of a spade. In discussing the subject the Chairman expressed the opinion that more could be done with open than closed drains. The Hon. Secretary said that whilst closed drains were the better where intense culture was carried on, their cost made them prohibitive for wheat paddocks. In undulating paddocks a few deep plough furrows soon opened up into drains which would keep the soil from becoming waterlogged.

Koppio, August 10.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. F. Richardson (chair), M. and T. Gardiner, Brennand, Thompson, R. Richardson (Hon. Sec.), and one visitor.

MIXED FARMING.—Mr. Gardiner read a paper on this subject, in which he urged agriculturists to give their attention to crops other than wheat-growing. Had farmers in the district, when they took up their land, sown a few acres of wattles, a good return would now be incoming from the sale of the bark. Continuing the paper said—"Keeping sheep is another profitable item in connection with wheat-growing, but care should be taken to provide ample feed. Rape is an excellent early fodder for stock, and can be grown well in this district; and as fat stock are at a premium on Eyre's Peninsula at this time of the year there would be a big profit in having a small paddock or two sown with this or other fodder, and getting some early fats. It must be remembered that a good Merino is the best sheep for wool (and it costs very little more to keep a good sheep than a poor one) although not favored by some for mutton. After seeding such things as onions, potatoes, mangolds, and some summer fodders can be grown. Lucerne will do very well in this district, and lasts a long time after once sown. Sheep's burnett and kale are also excellent fodders for summer and autumn. I would advise growing one's own onion plants from selected seed, although they can be bought from 2s. to 3s. per 1,000. By following the advice given by Mr. Colebatch at the May meeting of the Agricultural Bureau at Mount Gambier, mangolds could be profitably grown on some of the flats and gullies, which would make good feed for the cows, of which two or three good ones should be kept. They in turn would give a profit, besides keeping the farm supplied with butter and milk, which is considered by some as half the living. It would pay farmers to fence off a small paddock and sow it with lucerne and run their pigs in it. Pigs do very well in this district, and there is generally a good sale for weaners after harvest. If farmers went in more for small things and put plenty of stable manure on their lands the loss sustained would not be so heavy when wheat crops fail." In discussing the subject members said smaller paddocks were generally to be recommended. The Hon. Secretary thought that by sowing different varieties of fodder crops at various times of the year a farmer could have green feed for his stock all the year round.

Miltalie, August 12.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. J. P. Story (chair), I. W. and E. Story, T. A. and P. G. Wilson, J. S. Jacobs, Ramsey, Robelt, Hier (Hon. Sec.), and two visitors.

QUESTION BOX.—The meeting took the form of a question evening. The matters of

the relative advantages of selling wheat in bulk and the system at present in vogue, and the benefits likely to accrue from direct purchase of manures in bulk by farmers were referred on to Congress.

ROLLING SCRUB.—In reply to a query as to the best time to roll scrub, Mr. Jacobs said it depended on the nature of the scrub to be rolled. Heavy scrub should be rolled early in order that it might have time to dry. Light scrub should be burnt as early as possible after rolling, as the leaves dropped off if it was left too long. Some thought the most suitable time to roll was when the sap was up.

Petina, July 22.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. W. Penna (chair), Doley, Roberts, Howard, Souter (Hon. Sec.) and six visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. Howard. Members first inspected the wheat paddocks, where most of the crops were looking well. One paddock, 54 acres in extent, was fallowed 5 in. deep in August and left until the following seeding, when 45 lbs. of Federation and 45 lbs. of super. per acre were drilled in. The resulting crop yielded 15 bush. to the acre. The following seeding the stubble was drilled with 30 lbs. of Federation and 45 lbs. of super. per acre. This yielded 10 bush. to the acre. This year the stubble was burnt off, and seeded with 45 lbs. Federation and 45 lbs. super. per acre. As the seed has just been drilled in, very little grass was showing. At the other end of the paddock, 50 acres which had been cropped twice with the one ploughing was very grassy, due to the fact that it was fallowed after the grass seeds had ripened. From this the advantage of early fallow was apparent. A patch of two acres of Cape barley was looking well, and was stooling splendidly. Gluyas wheat on summer-ploughed land looked fairly well, but was inclined to be grassy. About 20 acres was noticed to be thin. Mr. Howard pointed out that exactly the same amount of seed and manure was sown on this patch as on that bearing a thicker crop. The seed sown on the thin portion was pickled with fungisine, and kept for about a week before sowing. The usual directions were followed in pickling. The thicker piece was pickled with bluestone. Mr. Howard had found that when wheat pickled with fungisine was sown within a day or so of pickling it came up just as thickly as unpickled wheat. He had kept wheat that had been pickled with bluestone for 12 months, and it came up as thickly as that which had been recently pickled. Fifty acres of Silver King on fallow land was stooling well and looked well, while 100 acres of Steinweidel was, in the opinion of members, the best crop on the farm. An eight-furrow Linke disc plough was inspected, and although it was thought by some that it would not jump stumps, Mr. Howard assured them that it would jump anything that would go under the draught bar, and that no amount of rubbish would choke it. Eight horses would work the plough at a depth of 5 in. Thirty acres of oats was stooling well, and the same area of Le Huguenot wheat looked healthy. It was found that stock would not touch the oats where they could get Le Huguenot wheat.

LAMPAS IN HORSES.—In reply to a query as to the best method of treating lampas in horses, the Chairman suggested pricking them, and then rubbing in salt. Mr. Howard thought it advisable to leave them to nature, but in extreme cases to lance about ¼ inch deep just behind the teeth. Care should be taken that the bars of the mouth were not cut across, as this would cause profuse bleeding. [It is wise to consider well before treating a horse for lampas. Many animals have been made to suffer under painful "remedies" when they really had not the complaint at all.—Ed.]

RABBITING.—Mr. H. Doley read a short paper on this subject, in which he said that the best method of becoming rid of the pest in summer was to fill in the holes and heap the earth well on top. As the rodents were then generally poor they had not the strength to dig their way through. When time was limited, poisoning with phosphorised pollard, either by the aid of the poison cart or by laying the poison round the burrows, was advocated. Burrows should then be filled in. At this time of the year trapping was the best method. Wire netting traps were used with success in rock holes and hard ground, and even under netting, but in soft earth the pests would burrow alongside the traps. Traps were made of 3 ft. wire netting cut 2 ft. 6 in. on one side and tapering to 1 ft. 6 in. on the other, and then rolled into the shape of a sleeve. A circle of stout wire was made and covered with netting and placed inside the sleeve, and another circle not quite so large was fastened about 4 in. in from the edge, and the door suspended from it. A good plan was to prop up the door slightly with a stick, which would be knocked down by the

rabbit going into the trap. As many as 10 rabbits were caught at once in a trap of this kind. Gin traps were very good, but judgment was required in the setting of them. Members thought poisoning and filling up the burrows was much quicker and less expensive than the use of the fumigator.

Shannon, August 5.

PRESENT.—Messrs. Cronin (chair), Carey, Glover, Proctor, Wilkin, Gordon, Cronin, and J. J. Cronin (Hon. Sec.).

AFFORESTATION.—Mr. Bartley read the following paper on this subject :—" It is a very wise plan to plant a few acres of trees every year, as the time is not far distant when timber will be a very scarce commodity in South Australia, and fences will want renewing and mending. It would not be of any inconvenience to cropping to plant trees all along fence lines and across the corners of paddocks : by doing so shade and shelter for stock would be provided. The variety depends on the soil and climate, but in these districts I think sugar gums do the best, and they grow very quickly and straight. The blue gums are quick growers, but have a tendency to grow a little crooked. They are very good material when turned into timber, and will withstand time and white ants, besides cutting a great number of posts. Pines are the best for shape and straightness, but grow so slowly that they will not be of use for 20 years or more for renewing old fences. The Australian red gum is a slow grower, but a good one will split as many as 50 good 6 x 3 fencing posts, while a pine will only cut two or three posts. The sugar gum will not cut many posts of as good a quality as the red or blue gum. There are a great many other trees that will grow satisfactorily in this district, but the abovementioned will meet all requirements if planted properly. It is advisable to plant sugar gums for early use and blue gums for later. If there is no immediate need of timber red gums are the most suitable to plant."

Miltalie, Utera, and Elbow Hill.

A Conference of the above Branches was held at Miltalie on the 10th August. There were present 40 members and 20 visitors.

ENGINES FOR FARM WORK.—This subject was dealt with in a paper by Mr. C. L. Venning (Utera). He considered that when there was stationary work, such as chaff-cutting, grinding, &c., it paid to have an engine. When purchasing it was always advisable to buy the best. For handiness and safety, a petrol engine could not be beaten ; but for heavy work and durability he preferred an oil engine. These ran more steadily and much more easily. Careful attention was necessary for all engines, good spirits must be used, and plugs must be kept in good order. A faulty plug, or inferior oil, was the cause of most troubles with petrol engines. The magneto and carburetter should be kept clean, good lubricating oil used, and plenty of air given. The engine should be timed as near as possible, or backfiring and knocking would result. In the discussion which followed, most speakers considered that oil engines were more durable and cheaper to run than those driven by petrol.

DESTRUCTION OF WEEDS.—A paper on the subject of the destruction of weeds with the aid of chemicals was read by Mr. T. A. Wilson (Miltalie). In discussing the subject, the consensus of opinion of members was in favor of killing weeds by fallowing. If a chemical destroyer were invented farmers would not fallow as much as they do at present, and that would be an evil. Moreover, the advantages would not be so great because there would be a shortage of feed for stock. It was recommended that the grass be grazed off before fallowing, and then the land be well fallowed ; when weeds appeared sheep could be turned on the land, and then it should be fallowed and harrowed again in June, and once more in September. One member recommended the use of the cultivating plough instead of the cultivator. It was stated that an experiment was being tried by drilling in 70lbs. of manure on the land to be cropped, in March, then when the weeds came up with the early rains the sheep were turned into the land, and a little more manure was drilled in with the seed. The results of this experiment were being awaited with interest.

SOIL DRIFT.—Mr. Andrew Ramsey (Utera) introduced a discussion on soil drift, and stated that this was one of the most serious questions affecting the whole of the State. Last year he ploughed some of his land with a mouldboard plough about 5in. deep, and now it was drifting backwards and forwards from one paddock to another and filling up the road. He had cropped the land early and again in May and June, and he now had over 100 acres which he would give away for nothing. He intended to try ploughing in

the straw and fallowing when the grass was high. Various other methods were recommended by the members, such as planting couch and marram grass, cross-drilling, and leaving strips of scrub. Mr. Ramsey, in reply, stated that where he had worked in a large quantity of straw the land did not drift.

FALLOWING.—Mr. G. F. Wake (Elbow Hill) read the following paper on "Fallowing":—"In the Elbow Hill district the land is becoming exhausted, so it behoves us to fallow and work it so that the moisture which falls during the year can be conserved and fertility restored. In the first place I would plough about 4in., more or less, according to the nature of the soil, and harrow immediately after the plough, while the soil is damp, thus preventing a crust from forming. If weeds come up, turn the sheep on to it. After the next heavy rains plough it both ways with a disc cultivator, which is the best implement to work the fallow, as it pulverises the soil, reducing it to a fine tilth. This is absolutely essential to the conservation of moisture. Then harrow again, and if any more weeds remain, again plough with the disc, and harrow after every rain. Frequent harrowing retards evaporation, which takes place very rapidly if the soil on top is not kept fine and loose. Before the drill harrow only unless the weeds are thick. Ploughing fallow too deeply renders the soil too loose underneath, and favors "takeall." The opinions expressed on fallow were varied, but it was generally conceded that deep fallow was fatal except in very heavy country.

RABBIT DESTRUCTION.—Mr. J. Abrook (Utera) introduced a discussion on rabbit destruction, and stated that he thought the law should either be amended or else be more vigorously enforced. He thought that the wire netting should be of a smaller mesh and of a greater height. The members considered that the best way of dealing with rabbits was to destroy the burrows, and it was pointed out that persons applying for wire netting could have the wider netting with smaller mesh if they desired it.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Forster, August 5.

PRESENT.—Messrs. J. Searle (chair), W. T. G. and H. Searle, Payne, Hayman, W. and R. Whitfield, Towill.

FARM LABOR.—Mr. C. Hayman read a paper on this subject, in which he pointed out that, wherever practicable, it was advisable for a farmer to keep a man on the place all the year round. When the farmer did all the work himself his team was standing idle very frequently when it could be profitably employed. The practice of some farmers of employing labor when there was a rush of work and dispensing with the employé directly the rush was over reacted on to the heads of the employers. This not only made the labor dearer, but encouraged a low grade, unskilled, and migratory class to undertake the work. Consequently there was an insufficiency of suitable labor when required.

Lameroo, August 5.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. J. Trowbridge (chair), Cameron, Sinclair, Mead, Thyer, Spicer, Birne, W. J. and S. G. Trowbridge, Hannan, Gibbon, Blum, Mathias, Koch (Hon. Sec.), and two visitors.

PRUNING FRUIT TREES.—Mr. Geo. Quinn (Horticultural Instructor) gave a demonstration of pruning on the property of Mr. Sinclair under the auspices of this Branch. Members greatly appreciated the suggestions and practical information given.

CLEANING WHEAT.—Mr. A. Blum read a short paper on this subject. For securing a clean sample of wheat in a mallee district he preferred the stripper and motor winnower. Where there were sandhills, stumps, and mallee shoots to contend with the harvester could not make such a good clean sample of wheat.

Monteith, August 12.

PRESENT.—Messrs. Heithersay (chair), Travers, Murphy, Gregory, Hannaford, Nancarrow, Ferris, Wells, McAskill, Smith, Gum (Hon. Sec.), and four visitors.

ENSILAGE AND FODDER CROPS.—The subject of the most economical cultivation of swamp blocks was introduced by Messrs. Wells, and Gum. The former spoke of the value of the silo as a means of conserving fodder when there was an abundance to tide over the period of shortage. Mr. Gum thought it advisable to make lucerne hay, and grow early barley for feed during the dry autumn and winter. The speakers advocated the growing of lucerne, maize, sorghum, mangels, and barley as excellent fodder crops. Potatoes, also, were profitable. In discussing the subject, members thought the silo would be more valuable where irrigation could not be resorted to and where lucerne did not grow. Some favored growing grasses for permanent pasture on a part of the swamp, but as very little grass seed had been sown until this year members were unable to express an opinion as to the value of grasses.

Morgan, August 5.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. R. Wohling (chair), Hausler, R. Wohling, jun., French, and H. Wohling (Hon. Sec.).

MURRAY SWAMP LANDS.—Mr. Hausler read a short paper on this subject. He said that the demand for land could, to some extent, be met by the Government reclaiming more of the swamps along the River Murray, and by granting financial assistance to persons who were prepared to undertake the draining of swamps. A good discussion followed the reading of the paper.

Parrakie, July 29.

PRESENT.—Messrs. F. Layman (chair), Beelitz, Diener, Temby, Lee, Randall, O. and C. Heinzel, Threadgold, Hameister, Hammond, A. Dayman, Hall (Hon. Sec.), and one visitor.

BREAKWINDS.—Mr. Randall read a short paper on this subject. He thought the reserving of timber for this purpose was a very wise provision. The reserves prevented the drifting of sand. If blockholders destroyed rabbits on their holdings there would be little need to complain of the breakwinds harboring the pests. In the discussion which followed, Mr. Randall said the reserves should be cleared and added to the block adjoining, as the harbor they afforded for vermin outweighed any advantages they afforded as a protection against wind. Mr. Temby said if the breaks were cleared sand would drift on to the roads and cause trouble, with which opinion Mr. Beelitz and the Hon. Secretary concurred. Mr. Diener thought the ground was more likely to set down solidly than to drift if the breaks were cleared. A vote was taken on the subject, and the majority favored the windbreaks.

LUCERNE-GROWING.—The following paper was read by Mr. Gravestocks:—"A patch of lucerne near the homestead is invaluable. It makes a great tonic for both horses and cattle during the summer months. Poultry also do well if allowed to run on it. In this district, where excellent water is available for irrigation, I would choose a piece of heavy land and plough in a liberal dressing of stable manure; then drill or broadcast in 5lbs. or 6lbs. of genuine Hunter River, or any good broad-leaved variety of seed, with 1wt. of super. per acre. Mix the seed with the super., but sow immediately after mixing. When growing without irrigation I have had best results on sandy land. Choose a piece of flat, yellow sand for preference, fallow it up, work it down well, and remove all stumps and rubbish. As soon as the frosts have disappeared drill in the above-mentioned quantities of seed and super. It is necessary to have the plot fenced so that it can be spelled occasionally. This lengthens the life of the plant. If properly fed off the plot should profitably last for five years, when it should be ploughed up and resown. Mr. Beelitz, in discussing the paper, said every farmer should have a patch of lucerne. A piece of heavy land cleared of all stumps, dressed with two applications of super. and well worked up before sowing, made an excellent seed bed. Mr. Lee thought feeding lucerne to milking cows tainted the milk. [Not if it is allowed to wilt a little before feeding.—Ed.] The fodder was not good for horses. Mr. C. Heinzel had put in lucerne, but the frost killed most of it; that which escaped the frost had grown well, but it should be irrigated to obtain best results. Mr. Hameister favored sowing lucerne with wheat, so that it would be sheltered from the frost; it was a good fodder, and he did not

think it tainted milk when fed to cows. It grew well on good land without manure. Stable manure was the most suitable to use on poor land. If irrigated, lucerne would last for 15 years with one sowing, and could be cut six times between September and May. Mr. Randall considered it the best green feed grown. When made into hay, stock ate it with relish and did well. It grew better on light than on heavy land. Mr. Diener said lucerne needed flooding occasionally, and always needed plenty of water. The chairman had prepared a piece of new ground, and had given it a dressing of stable manure 3in. thick. He sowed early in August and got 5cwt. off it in a year. Where possible, he would sow in chocolate-colored sand, as it did not require so much water as clay land. The fodder would grow better if it were worked with the scarifier harrows every second year and thus thinned out.

Parrakie, August 26.

PRESENT.—Messrs. Dayman (chair), O. and C. Heinzel, Hammond, Temby, A. F. Dayman, Hameister, Brinkley, Lee, Randell, Diener (Hon. Sec.), and one visitor.

DESTRUCTION OF RABBITS.—This subject was dealt with in a short paper read by Mr. Hameister, in which he said that as very few rabbits were to be found in burrows the most effective means of eradicating the pest was to poison them with strychnine and flour or poisoned wheat. In discussing the subject Mr. Randell thought the easiest way was to fill in the burrows and ram them well. In doing so the rabbits would be suffocated. Mr. Brinkley said they would not suffocate by the holes being filled up, as they always had breathing holes in their burrows. He thought carbide was very effective in getting rid of them. Mr. Temby said he thought poisoning was the best. The council should have a poison cart and hire it out. He did not think it advisable to use strychnine, as it was too dangerous. Mr. C. Heinzel said he had tried poisoned wheat and it acted very well. Phosphorus was no good when there was green feed about, as they would not take it; and blocking up the holes was not much better, as there were very few rabbits in them. He had spent a whole day digging without getting any. The poisoned wheat was also the cheapest. Mr. Hammond said something ought to be done, as rabbits were becoming very numerous. He did not favor the use of a poison cart, as it could not get through the scrub, which was just where it was most wanted. Mr. O. Heinzel had used strychnine-poisoned wheat with good results. Mr. Lee did not think they would ever be very troublesome. The country was not strong, and burrows could easily be dug out. He thought in a few years they would all die out. He would go out occasionally with a gun. Mr. A. Dayman favored the use of carbide. The Hon. Secretary said the only way to get rid of rabbits was to clear the scrub. For killing them in the burrows the "corpse creator" was the handiest and most effective. Using carbide or Finlayson and Cousins' patent meant carrying around a lot of tins and water in addition to the carbide, &c. The "corpse creator" held enough bisulphide of carbon for six hours' work, and a match put to the burrow afterwards would cause the fumes to explode and kill everything in the burrow. A good plan was to fill up the burrows first and then visit the ones that had been opened. The Chairman had caught a few in traps, but it was hard to say if they were going into the burrows or coming out. In reply Mr. Hameister said if farmers went to a little trouble in the summer rabbits would not be so numerous in the winter. The poison cart was no use when there was green feed about, and it was just then they were most troublesome. Killing them in the burrows was all right, but the trouble was to get them there. The majority of members favored poisoning as the most effective method.

SHEEP IN PINNAROO DISTRICT.—Mr. Dayman read a paper on this subject, in which he expressed the view that, provided sufficient protection against wild dogs and foxes could be afforded, keeping sheep would be very remunerative. It would be necessary to clear the land, with the exception of sandhills, which he thought would provide better feed without clearing. Divide the land into 100-acre paddocks and securely fence each paddock with a 3ft. 6in. fence. A strainer at every five-chain interval, with iron droppers in between, one barbed wire on top, and 3ft. wire netting hung from one plain wire should make a suitable fence. Where a farmer had 1,500 acres to 2,000 acres it would pay to keep a flock of about 400 sheep to 500 sheep and employ a shepherd; but as a general rule 30 sheep to 40 sheep, yarded at night and kept for the meat supply, yielded a better proportionate return. In the discussion which followed Messrs. Hameister and Temby and Brinkley thought sheep would pay, but there was hardly enough feed about just yet for them. Mr. Randell thought sheep would pay even if they had to sow feed for them, as they did in some parts. Sheep always paid better than wheat-growing alone. Mr. Lee

said fencing cost a lot, but sheep would pay for the fence in a very short time. He would not go in for many for a start, but 100 sheep would yield a handsome profit every year. The Hon. Secretary said sheep were a great help in keeping weeds, thistles, &c., down. These were growing everywhere in the paddocks, and it would pay to have a few sheep for killing. They improved the land, as they converted a lot of rubbish into valuable manure. The Chairman said his cattle lived in the scrub last winter and did well, and sheep were more hardy than cattle. He thought they would live on the scrub and do well on it. The majority of members thought it would pay to keep a few sheep.

Renmark, July 11.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. Waters (chair), DeWitte, Huggins, Howie, Everard, Geneste, Davies, Cole (Hon. Sec.), and one visitor.

ANNUAL MEETING.—The Hon. Secretary read his annual report, which showed that during the year seven meetings had been held, with an average attendance of 10. The following subjects had been dealt with:—"Prohibition of the Introduction of Pip Fruits into River Districts," "Artificial Heating of Orchards," "Value of Irrigated Lucerne," "Peach Aphis," "Horse Disease," "Sugar Beet." Mr. Geo. Quinn (the Horticultural Instructor) who had visited the district in connection with the outbreak of oidium, was met by members, and had discussed with them various matters of interest.

SPRAYING VINES.—Members generally favored Bordeaux mixture as a winter spray for vines.

Renmark, August 10.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. Muspratt (chair), DeWitt, Pitt, Davis, Huggins, Waters, Everard, Braund, Cole (Hon. Sec.), and one visitor.

SUGAR-GROWING IN GIPPSLAND.—Mr. E. Pitt read a paper on this subject. In the Maffra district, with which he dealt, the land is held in large holdings and leased to tenant farmers receiving a third of the return. The soil in the district is a rich chocolate, and the rainfall about 20in. to 25in. The size of subdivided farms is usually 200 acres to 250 acres, which have a carrying capacity of from 40 to 45 cows. Dairying is the principal occupation, and spare time is devoted to the cultivation of maize or beet. The yield of the latter ranges from 16 tons to 30 tons per acre, the average being approximately 21 tons. This product must be planted on well-worked land; the chief item of expense in its cultivation is thinning. The Government had liberally assisted the producer.

Waikerie, August 7.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Burroughs (chair), Green, Jones, Modistach, Walters, Odgers (Hon. Sec.), and three visitors.

WHEAT-GROWING ON THE RIVER MURRAY.—This was the subject of a paper contributed by Mr. Burroughs. He considered wheat the best crop to grow on this sandy country, and he had been successful in growing a crop on only a 5in. rainfall. He used bluestone as a pickle, and this year he had heated some of it to 90°, which had the effect of opening the smut pores better, and the wheat had germinated more freely. He could not understand the difference in the price of wheat in Adelaide and this district. At Ramco wheat was quoted 2s. 8½d., when at Port Adelaide it was 3s. 3d. This was a greater difference than that existing in any other part of the State. He considered wheat could be improved in regard to strength of flour as well as size of grain. In discussing the subject, members considered the difference in price too great, but the extra handling necessary might have something to do with it.

CURRENT VINES.—Members considered 20ft. x 10ft. apart the most suitable distance to plant currant vines. While the vines were young it would be advisable to plant something, such as wheat, between the rows in order to protect the young plants from being cut by the winds prevailing between September and November.

Wilkawatt, August 5.

PRESENT.—Messrs. W. J. Bowman (chair), Bowman, Sorrell, Arhns, Tylor, Shulze, Ivett, Neville, H. and E. Brooker, J. and G. Altus, C. and T. Sorrell, F. and B. Speckman, D. Bowman, Harvey (Hon. Sec.), and six visitors.

FARM ECONOMY.—Mr. Shulze read a paper on this subject. In dealing with unimproved land he advised the farmer to commence his clearing on a small scale and to clear in long strips. As carting water was very expensive, early attention should be given to procuring a supply on the farm. When purchasing implements the farmer should not be guided altogether by the present strength of his motive power, but the prospective requirements of his increasing areas should be taken into consideration. Ploughs or cultivators that worked on the spring draught were preferable to those which worked on the bridle. A small blacksmithing and saddler's outfit could with profit be installed. Here the farmer could spend his time during inclement weather and thus spell his team. For horse feed on new selections it was necessary to clear about 20 acres, which should be cropped early with a good high-growing wheat. The return should be about 30 tons of hay, costing in the stack about £25.

VALUE OF OATS.—Mr. E. W. Brooker read the following paper on this subject:—"Farmers in this district grow very few oats, and if we went in for this crop more extensively we would gain by it. A good plan is to plant oats on all land that has been cropped with wheat three years in succession before leaving it out as a grazing paddock. It would then be a change to the land and would greatly benefit the next wheat crop, even though it be three or four years later. Oats are less liable to some diseases than wheat, and while growing they help to starve out takeall. Therefore wheat following oats stands more chance of being free from this disease. Again, oats do not require the same amount of preparation of soil as wheat, and they will grow just as well on land that has carried wheat as they will on new land, as the land is new to oats. They may be drilled in any time after harvest without any fear of their malting in the ground. They are always needed on the farm for feed, and make very good hay, which is an important item in this district. I believe we would improve our wheat yields if we cultivated oats on the land every few years."

HANDLING YOUNG HORSES.—Mr. H. F. Arhns dealt with this subject in a short paper, in which he urged the necessity of mastering a horse whilst it was young. When being broken in it should be mouthed before being put into harness. The open bridle was preferable. After the animal had been run round in a circle for a while it should be put on the nearside of a quiet horse and fixed to a log, or it could be put into a team. The whip should only be used as a last resource.

SOUTH AND HILLS DISTRICT.**Cherry Gardens, August 8.**

(Average annual rainfall, 35.3in.)

PRESENT.—Messrs. Chapman (chair), Stone, H. and J. Jacobs, Hicks, Lewis, A. and E. Broadbent, Lewis, Ricks, Mildwater, Curnow (Hon. Sec.), and three visitors.

ESPALEERS.—Mr. Ricks read a paper on this subject, in which he explained the method of growing fruits adopted in England and other countries where land was limited. To adopt the system to local conditions, posts about 8ft. long and not less than 18in. across the top should be buried to a depth of 3ft., to act as strainers. Other posts should be 7ft. by 6in. by 4in., and buried to a depth of 2ft. No. 6 galvanized wire should then be run through the posts, one wire 18in. from the ground, and two others equidistant between the first wire and the top of posts. Posts should be about 12ft. apart. "When planting," he said, "the trees should be placed not less than 12ft. apart, and they should be trained from the first year on the same principle as was adopted with vines. There was no necessity to allow branches to grow to any great length, as with proper pruning all the fruit space should be on the main branches. Under this system of fruit-growing, it was possible to cultivate fodder crops between the trellises; and in addition pruning and picking were facilitated, and the influence of the wind was not so keenly felt."

Clarendon, July 17.

(Average annual rainfall, 33½ in.)

PRESENT.—Messrs. E. A. Harper (chair), Hilton, Piggott, Spencer, A. A., H. C., and A. Harper, A. L. and W. H. Morphet, Sheidow, White, Phelps (Hon. Sec.), and one visitor.

CLOCKSPRING PLOUGH.—In discussing the question as to whether the clockspring plough was a suitable implement for the Hills district, members said they had seen it working on the level and over steep rises, but did not think it would work satisfactorily on the side hills.

RHUBARB.—Mr. A. A. Harper tabled a nice sample of rhubarb. This had yielded most abundantly all through the winter, and would continue to do so through the summer if manured and watered.

AILMENTS OF HORSES.—Mr. Piggott initiated a discussion on ailments in horses, which in the majority of cases he attributed to negligence, improper feeding, and overwork.

Forest Range, August 10.

(Average annual rainfall, 36 in.)

PRESENT.—Messrs. Sass (chair), McLaren, F. and H. Green, E. Green, Rowley, Pollard, and Monks (Hon. Sec.).

MARKETING GARDEN PRODUCE.—Mr. McLaren read the following paper on this subject:—"As a general rule, people in business who have any commodity to sell have the privilege of asking a certain price for it, and if you wish to purchase you have to pay the price or go without. There is usually a mutual understanding between tradespeople as to a general price for a certain article, but with market gardeners there is nothing but a cut-throat system of disposing of fruit and vegetables. You can go into the East-End market very often and purchase what you want at your own price—the buyer is buyer and seller too. This sort of thing should not be. The grower should have a say in the price of his produce: but there is no unity among the growers, and consequently no uniformity of price. I have known two different growers selling apples of equal quality, the one got twice as much for his as the other. A system that follows this sort of thing is not right. Who is to blame? Some say the packers. Some say the hawkers. I think the growers are at fault, because there is no unity among them; and where there is no unity there can be no system. There is no doubt that where there are so many different grades of fruit and vegetables it is a difficult matter to fix a uniform price. What is needed is a system whereby the best article will bring the best price. Personally, I think the auction system the fairest. This would prevent to some extent the packers making the price. The fruit and vegetable growers should unite and form a strong association and take a good deal of the packing into their own hands and deal more directly with the consumer or country dealer. By forming a strong association the growers could have their own depot for packing and forwarding." In discussing the subject, Mr. Pollard said growers were not loyal enough to each other so far as the marketing was concerned. The market should be close to the railway station, as at present it was difficult to catch trains with goods for the North. The middle-man got too much in comparison to the return of the grower. Mr. E. Green thought a minimum price could be fixed for produce. Members generally agreed that the present system required amendment.

Gumeracha, August 7.

(Average annual rainfall, 33 in.)

PRESENT.—Messrs. Porter (chair), B. and H. W. Cornish, Monfries, Moore, Norworthy, Hittmann, Hanna, and Lee (Hon. Sec.).

VEHICLES.—Mr. Cornish contributed the following paper on this subject:—"In a district such as this, where all produce raised and everything that goes out of the district as well as everything that comes in, has to be drawn by horses, the cost of such haulage is governed by the amount each animal can draw. It will be seen at once that, if we can do anything to increase the power or reduce the load we shall to that extent lessen the cost and so pocket the difference. Therefore, I purpose to touch on a few points to see if we can do anything in that direction, and I will deal with the question as follows:—First, width of tires; second, height of wheels; third, width of wheels apart (both ways); fourth, draught; and fifth, construction: First—*Width of Tires.*—As a whole, I cannot find much fault in this direction in this district. Generally, we strike the

happy medium ; but there are, of course, some exceptions. After a long experience I have come to the conclusion that the following figures give about the best result for our purposes, viz.—for four-wheeled vehicles to carry up to 1 ton, tires should be 1½ in. wide ; up to 1½ tons, tires should be 2 in. wide ; up to 2 tons, tires should be 2½ in., and so on, adding ½ in. in width for every additional ½ ton. These figures are far in excess of the Width of Tires Act, but that Act is too liberal, and it is better to be on the side of width, as in bad soft roads, and that is where our troubles occur, the wide tire is always best ; but for fast travelling on good, hard roads a wide tire runs more heavily than a narrower one does. Let me here say that these remarks are meant to apply to bad, soft, and hilly tracks. Second—*Height of Wheels*.—Here many people are making a great mistake in giving up the van for the trolley. Granted that the trolley is easier to load, what of that ? We spend perhaps half an hour in loading, and say seven hours on the road ; yet we will sacrifice our horses for seven hours for a few minutes' convenience to ourselves, which convenience could be easily obtained in another way without hurting the horses. Low and narrow vehicles are the bane of horseflesh and the ruin of roads. If we must have the trolley body, let it be made with wheels a foot higher. I am sure it would be found to be much better. I maintain that more load can be taken up hill over soft roads or new metal on the van than on the trolley, and that means cheaper transit. Third—*Width Between Wheels*.—There is an impression abroad, with some people, that vehicles wide and long between wheels run heavier than when wheels are bunched together. This is erroneous, as can be shown. No one has ever been able to prove to me why it should be so, while there is abundant evidence to the contrary. Theoretically, on dead level and hard road there is no difference, but on soft and hilly roads the balance is all in favor of the wide vehicle, and, again, this is the road we have to deal with ; level roads do not trouble us. It annoys me when travelling to see the wretched narrow trolleys that we sometimes meet, and to see the difficulties that the horses and drivers have in consequence. Fourth—*Draught*.—This is a matter that requires serious attention. I regret to see the draught on many vehicles placed very low. Let us consider the facts. A horse can draw ten times as much as he can carry. For this reason we do not load our horses as they loaded the donkeys in olden times, and for this reason also we put the load on wheels ; and because the horse can better draw than carry the sensible man puts all the load on the wheels, and leaves the horse as free as possible. It pains me to see the slovenly method adopted on some vehicles of drawing the load with a chain from below the front axle, which allows the swing (when going down hill) to trail in the mud, the owner fondly imagining that he is helping his horses by such an arrangement. Their theory is, of course, that by this plan the horse when pulling hard tends to lift the front wheels. Well, if he does, then in just that degree is he doing himself harm. If the horse in pulling hard lifts the front in any way, he does so when going up hill, most of all when the hind wheels are carrying from 60 to 80 per cent. of the load, and any such effect must be to place still more of the weight on those wheels already overloaded, and the only ones likely to be in difficulty at such a time. Where is the gain ? But some may say the horse takes some of the weight. Granted ; but where does he carry it ? On his shoulders—the very place where he can least afford to have it. I have already shown that the horse should carry none of the load ; but if we must persist in loading him, let us at least put it on his back, where he can carry it best, and leave his shoulders free. How can a horse trot freely and draw a load with the weight dragging down on the points of his shoulders ? The height for the draught should be about the top of the fore under-carriage of our vehicles, as made to-day. At any rate, we should have it at the most convenient height for the horse's comfort and freedom of action, and let all the weight be on the vehicle. Fifth—*Construction*.—That is to say, construction with a view to maximum of strength, with the minimum of weight. I have not much to offer on this point, as I must say that, as a whole, the vehicles of this district compare favorably for common-sense principles with anything I have seen in this State. But there is a point or two to which I would like to draw attention. The moderately wide vehicle will be stronger in one direction for the reason that it is when it is down on one side, with the weight being thrown on that side in a compound way, that the spring gives way. As the wider one does not sink so much, that side has less to carry, so a lighter spring will carry the load. But a greater point is to see that in construction the springs are placed as close to the hub of the wheels as possible. This gives a great deal more strength to both springs and axle. All vehicles of four wheels not using always leading horses should have alternate draught attachments. Every driver knows the misery of driving a strong horse and a weak one together ; the weak horse is pushed across the road by the pole against him, is still further handicapped by being driven to the soft side of the road. To avoid this let each vehicle be provided with an appliance on each side similar in principle to the head of a plough having two or more notches, covering a space of, say, 6 in. or

more wide. The draught of the weaker horse to be placed in outer notch, so giving him advantage over the other, and allowing him to keep his wheel forward without distress, which before he could not do. This would allow the horses to keep the road without weariness to the driver, who otherwise would have to keep his hands on one rein continuously. I am certain this will be found to be a good thing. I intend to apply it to my own van immediately, and it would be of great service whenever either front wheel was in difficulty, and would apply with even greater force to operations on hilly or soft land about the homestead." In discussing the subject, Mr. Hanna said it was an advantage to have the wheels wide apart in hilly country. The closer together the wheels were set the more likely was the vehicle to turn over. He believed in having the draught from the front carriage. Mr. Norsworthy believed in a high draught, but did not think trolleys or any narrow vehicle a disadvantage, except for a week or two during the year. Mr. Moore thought the 1½ in. tire too narrow; he preferred 2 in. The trolley did not run so easily as did the van. He thought the draught should be lower than the front carriage, but did not believe that any extra weight would be thrown on the back wheels by drawing from the axle. Mr. Monfries thought the higher the draught the less the horses suffered from sore shoulders. The van was better than the trolley for farm work, but for road work he would have the vehicle wide. Mr. A. W. Cornish said the further the front wheels were from the back the greater would be the advantage on rough roads. Mr. Porter believed in high wheels and wide tires.

Hartley, August 5.

(Average annual rainfall, 16 in.)

PRESENT.—Messrs. B. Wundersitz (chair), O. Wundersitz, Brook, Phillips, Hudd, Symonds, Tydeman, Pratt, Clark, Stanton, Birmingham (Hon. Sec.), and three visitors.
NOXIOUS WEEDS.—It was reported that the saffron and star thistle were becoming very troublesome in the district. It was mentioned that it was better not to cut these at all than to cut them when in seed, as this only resulted in the dry seed being blown over an even larger area.

SLUGS IN WHEAT.—It was reported that considerable damage had been done this season in wheat crops and in grass by slugs. Harrowing and rolling the crop, thus killing the slugs, was considered the best means of coping with the trouble.

Kingscote, August 8.

(Average annual rainfall, 18½ in.)

PRESENT.—Messrs. F. Turner (chair), Anderson, Bromfield, Castine, B. and K. Nash, Cook, Ewens, Jacka, Hawkes, Bell, Wright, Woods, Neave, and Cook (Hon. Sec.).

UNDEVELOPED CROWN LANDS.—The Branch decided to draw the attention of the Government to the fact that a large portion of the Crown lands on the Island were undeveloped, and request that, instead of purchasing expensive freeholds on the mainland, the cheaper land on the Island should have the attention of the Government.

EXPERIMENTAL PLOTS.—The experimental plots being conducted by the Government formed the subject of considerable discussion. It was thought that the Government should have an experimental farm on the Island, and root crops should be grown. Such crops as sugar beet, turnips, swedes, mangels, &c., should be tried.

Longwood, July 15.

(Average annual rainfall, 37 in.)

PRESENT.—Messrs. W. Nicholls (chair), J. Nicholls, Oinn, Pritchard, Blakley, Vogel, and Coles (Hon. Sec.).

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. Coles. As the past growing season had been favorable to fruit trees, they presented a healthy and pleasing appearance. The wire netting had not been completed, and hares had stripped several young apple trees of the thin outside bark—from the lower limbs downward. Mr. Coles was advised to tie bagging firmly round the trees. A peach tree was found to be attacked by a fungus, which penetrated through the limbs, and caused gumming. Tufts of live growth were on the ends of unhealthy looking branches. Spraying several times during the dormant period with Bordeaux was suggested as a remedy.

NOXIOUS WEED.—Members noticed a plant called "Genesta," or "Yellow Broom," which had been planted originally for ornamental purposes, growing profusely in the Mount Loftly district. It killed out other grasses, was spreading rapidly, and generally threatened to become a nuisance. A deputation had waited on the Stirling District Council recently, requesting that steps be taken to have the plant proclaimed noxious.

Lyndoch, August 10.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), J. Mitchell, Kennedy, Burge, Lawes, H. Springbett, Klaube, Schrader, and Hammatt (Hon. Sec.).

CODLIN MOTH.—The following valuable paper on this subject was read by the Hon. Secretary (Mr. J. S. Hammatt):—

Life History and Habits.—Like all other moths and butterflies, there is a cycle of existence—the egg, caterpillar, pupa, and matured moth. At the present time the caterpillar is in hiding. I have been told that the caterpillar on approach of winter turns in its case to a chrysalis; but this is contrary to my own observation. The caterpillar undergoes no change during the winter months; and it is not until the sap flows freely in the apple trees that the change takes place. Then the caterpillar becomes dormant in its case soon to emerge as a full-grown moth. Of numbers of caterpillars I have had under observation it takes 15 to 17 days in the pupa stage. When the warm days of summer approach, the moth emerges to spend its short life in serious flirtation among the apple blossoms. They are fairly numerous and most active in the milder parts of the day—the mornings and the evenings. During the middle of day (and the greater part of the day) they may be disturbed by tapping a limb, or found with wings partly extended on the shady side of a twig. Nature has painted them so cleverly that they resemble a piece of bark or dry wood. Often have I had to look at one twice to be certain it was a moth. Almost immediately after copulation takes place the female commences her work. The eggs are laid. The egg is of a yellowish tinge, oval, and very tiny (I have searched for years and have so far only found five), and laid within 24 hours of copulation, and they were all laid singly, three on apples and two on leaves. I have often thought I had discovered the eggs, but on hatching them out I found I had been taking care of some other insect. I believe the eggs hatch within a few hours of laying. I have not been able to discover over what period the female continues to deposit her eggs.

With the hatching of the egg the work of destruction begins. The tiny caterpillar, like a cotton thread with a black point, eats its way into the fruit. From now onwards it knows only one law—to eat and grow. This period of its existence—short or long—depends on the season, the weather, and possibly other causes. If the caterpillar belongs to the first brood, I think its period is short, usually 15 to 20 days; then it becomes a migrating caterpillar and wanders off to find another home in which to become a chrysalis, and as a chrysalis it spends 15 to 17 days, once more to emerge as a moth with all the proclivities of its parent, with only one desire—to multiply itself and perpetuate its species at the expense of the gardener or orchardist.

When the wanderer is on the lookout for a home it is not at all particular of the locality it may choose. A piece of loose bark or the fork of a tree makes an ideal hiding-place, secure from many of its numerous enemies. Cracks in limbs of trees, fallen timber, posts as supports for trees, or in fences, clods of dirt, and the bandages so carefully placed by the orchardist all afford excellent places for the change of life from caterpillar to pupa. Here I would like to say that I believe the bandages are very often cheated of their prey. On February 15th, 1911, I secured over 100 caterpillars that never reached the ground. They had crawled out of the apple that had nourished them over twigs, &c., to find a sound apple, and then had tunneled a cavity in the stem end, spun a cocoon over the outside, and were peacefully dreaming of a winged life when I hauled them out. Some few of the hundred were so skilfully hidden that it required a second view to be sure that something was wrong with that particular apple. I believe there are two main broods of moths each season (usually)—the first in October-November, the second one in January-February. The last season was unusual, there being no brood until January-February, or rather, the first brood consisted of a few stragglers that happened to be in hiding in warm, sunny places, but the bulk of the winter sleepers did not emerge until January-February, when the usual second brood makes its appearance. The first caterpillar I could discover was found on December 1st, 1910, and on December 3rd

I found two; on December 6th I found one; December 7th I found three; December 8th two; while on February 15th I found 233, and could not spare the time to look for more.

Fruit Attacked.—Its favorite fruit is pip-fruit—apple and pears; and to a lesser degree quinces. On the other hand, I have found apricots and plums with the caterpillar inside, vainly endeavouring to get at the kernel. I have hatched many of these apricot-fed caterpillars in confinement, and found them to be true codlin moths, and I am almost positive that they are barren. Possibly the want of apple pips has brought them to the end of their species. Someone told me that the codlin moth attacks tomatoes; but so far all the caterpillars I reared from tomatoes have turned out to be other species of moths.

Method of Attack.—Some caterpillars have the knack of driving straight ahead to the core, devour the pips, and then get out as soon as possible. Others seem to find themselves in the Land Delectable and are loath to leave a good place. They tunnel all round inside the fruit, very leisurely reaching the pips. This apple usually falls before its time—ripens prematurely. The caterpillar seems in no hurry to quit, and may get carried long distances before it leaves its snug quarters. I believe the first fellow is in a hurry to perpetuate its species, and usually belongs to the first brood, while its slower brother is more often found in the second or later brood. The first fellow often crawls out before the apple falls.

Position of Attack.—In my observation the favorite place to commence operations is on the side where the fruit touches its neighbor, or touches a twig or leaf. From December 1st, 1910 to March 12th, 1911, I have collected the following figures. I picked all the infested fruit I could find, as often as I could spare the time, and have tabulated the results, viz.:—

Entrance of Caterpillar.

Through calyx	274	Alongside	214
Through stem end	161	On sides	757 or 1,406.

That is, 50 per cent. entered where the apple touched something, as against 20 per cent. direct in the calyx end.

Enemies.—No doubt the codlin moth has as many enemies as that of any other moth if we could but find them. I have found many caterpillars that had fallen a prey to the spider. I have seen them caught in the spider's web as they have been descending on their own threads from a twig. Early one summer a pair of "willy-wagtails" built their nest in a Rome Beauty tree. Not one apple could I find on that tree with its three cases of fruit that had a trace of where the caterpillar had been. Last year I was annoyed to find the bandages were coming off the trees, and later on I found three magpies at work tagging for dear life until they had been successful, and when I rescued the bandage there was nothing living in it. Last season I found a parasite, and afterwards very many of them. Sometimes from 3 to 13 living, tiny, white, pulpy masses occupied the caterpillar's body. On hatching these out I found an insect, fly-like, but very tiny, jet-black body, with long, thin, gauzy wings. Since then I have observed what I took to be the same insect in hundred flying at dusk.

Spraying.—I have arrived at the conclusion that bandages are useful, but entail a lot of work that is not commensurate with the profit gained: and that instead of catching the caterpillar when he is big and fat, and then crushing him or boiling him down, that a better method would be to catch him before he has done the mischief. I believe one or other of the various brands of arsenate of lead on the market if applied at the right times will give the best and cheapest results. I have two pear trees that I used as an experiment in 1910 and 1911. Whenever in passing them with an almost empty tank I drench the fruit. This was on five separate occasions. Result—five cases of pears and three cases of pears; on the first tree two caterpillars, and on the second tree one caterpillar; while on an apple tree adjoining (only sprayed once) out of four cases of fruit fully 60 per cent. were codlin ridden.

Meadows, August 7.

(Average annual rainfall, 34½ in.)

PRESENT.—Messrs. Geo. Ellis (chair), Smith, Catt, Kleeman, Brooks, A. Ellis, F. Nottage, Morriss, Olsson, Nicolle, Stone, Bertram (Hon. Sec.), and one visitor.

BLIGHT.—Mr. Smith read a paper consisting of extracts from "Our Insect Allies," by T. Wood, dealing with blight and its enemies. In the discussion that followed the reading, Mr. Kleeman considered that bulldog ants and wasps killed a lot of blight. Mr. Smith thought more attention should be given to the study of insect pests.

LICENSING OF DAIRIES.—After a considerable discussion on this subject, the following resolution was unanimously carried:—"That the members for the Alexandra district be asked to exert their influence with the idea of securing the amendment of Regulation 5A of the Food and Drugs Act." It was considered that the registration of dairies in country districts, if necessary, should be left in the hands of the local boards of health.

Morphett Vale, August 15.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. Pocock (chair), Perry, L. B. and L. D. Christie, Anderson, Sprigg, Goldsmith, O'Sullivan, Rosenburg, and Hunt (Hon. Sec.).

VINES ON SMALL FARMS.—Mr. Anderson read the following paper on this subject:—"On small farms of from 160 to 200 acres there is necessarily a good deal of slack time. From the end of seeding until haytime, and from the end of harvest until seeding, there is very little for either workmen or horses to do. The way to remedy this is to grow some crop which requires working when the cereal crops are finished. Vines are about the only reliable crop which can be grown in this district to fill up the blanks. The expense of planting a vineyard, if the soil is suitable, need not be great. If a few acres are put in every year it can be done without extra labor. Vines ought to pay working expenses after the third year from planting, and increase in value every year until in full bearing. A vineyard in full bearing is worth at least £30 per acre if planted on suitable soil, and the returns will compare favorably with any crop that can be grown on the farm."

Mount Pleasant, August 11.

(Average annual rainfall, 27 in.)

PRESENT.—Messrs. Royal (chair), Miller, Thomson, Langton, Maitland, Phillis, Tapscott, and Maxwell (Hon. Sec.).

REGISTRATION OF DAIRIES.—After considerable discussion on this subject the following resolution was passed:—"This Branch is of the opinion that the compulsory registration of dairies is not necessary in country districts, except in townships."

STOCK REPORT.—Stock in the district are in good condition.

CROP REPORT.—Crops in the immediate neighborhood of Mount Pleasant at present are looking better than they have at this time for the last 10 years.

Port Elliot, July 15.

(Average annual rainfall, 20½ in.)

PRESENT.—Messrs. Brown (chair), Barton, Green, and Hargreaves (Hon. Sec.).

PEA-GROWING.—The following short paper on this subject was read by Mr. Barton:—"My experience of growing peas has extended over the past three seasons. The first year I drilled in 1½ bush. of peas with 50 lbs. of super. per acre. I had a very poor crop of about 12 bush. The next year I sowed 2 bush. per acre with 60 lbs. of super, which yielded a fair crop of 25 bush. The following year I sowed 3 bush. of peas and 1 cwt. of super., and harvested 40 bush. to the acre. I harrowed the ground before drilling, and drilled the peas in 3 in. deep, and rolled the ground after using the drill. Peas must be sowed thickly. If sowed thinly, the heavy winds blow the plants about, and they get damaged at the stem, and consequently do not bear well. A good way to thrash peas is to get two horses and a land roller, and clean them up in the usual way with a winnower. I harvested my peas with a pea-harvester, which made a first-class job. In a heavy crop, with a man to follow to keep the peas clear, one could do five acres a day. There is practically no waste of peas. I find pigs do better when fed with peas in the straw. I have sown peas on different parts of my land. I have since had a good crop of oats from land on which peas were grown. Peas enrich the soil."

In the discussion that followed members agreed that the quantity of seed and manure required per acre depended on the soil and the district. If planted too thinly, the stems of the plants were bruised by the wind.

Port Elliot, August 19.

(Average annual rainfall, 20½ in.)

PRESENT.—Messrs. H. B. Welch (chair), Chibnall, Brown, H. Welch, Barton, McLeod, Green, Hargreaves (Hon. Sec.), and one visitor.

HORSE-BREEDING SOCIETY.—Considerable discussion took place on this subject. Members were of the opinion generally that the majority of mares in one district would not suit any one horse that travelled; besides, the opinion of men differed a great deal as to what constituted a good horse.

APPLE CULTIVATION.—Mr. McLeod read a paper dealing with the neglect of this branch of agriculture in the district. There were hundreds of acres of land in the hundred of Goolwa, he said, which was admirably suited to the cultivation of apples. He considered the returns would be highly remunerative. The first essential in planting an orchard was to select a sheltered spot with an easterly aspect. Continuing, the paper read —“ Having procured a favorable site, the next thing is the fence. This is most important. It should be of good posts and six wires, the two top wires barbed and four plain No. 8 galvanized wires, with 3ft. wire netting. Thus, it will be rabbit, pig, and cattle proof. After the land has been well soaked, break it up 6in. deep, then harrow and cultivate, and if position allows, cross plough again. Of course, this applies only to clear land. If the land is timbered, it will have to be grubbed. I would suggest planting five acres the first year. If possible, and as much as is convenient each succeeding year until the whole area is planted. The next thing to consider is the kind of apple to plant, and on this point depends your future success. Many of our growers have made a mistake in planting too many different varieties. About six or eight of the best export kinds are sufficient; but be sure they are suitable to your locality. Cleopatra do well on our hills, but not on wet or swampy soils, which would suit Rome Beauties. It would be well for intending growers to make careful inspection to find out the kind best suited to their district. If we could get 20 or 30 young men to go in for 10 acres each it would pay them to form themselves into a society, so that they might purchase boxes and arrange for shipping on the co-operative principle. I do not see why they could not ship their fruit direct to England from Victor Harbor, which is one of the finest harbors in the world. Ocean steamers now call for a few hundred bales of wool. Why should they not for a few thousand cases of apples? I do not wish to imply that we are always going to get such big prices as have ruled this last season. We must be prepared to take much less. I contend that apples can be grown and a fair profit made at a third of this year's prices, especially if we ship from our own port.”

Uraidla and Summertown, August 14.

(Average annual rainfall, 42½ in.)

PRESENT.—Messrs. Hawke (chair), P. C. and T. Day, Curtis, Prentice, Hart, Rowe, Cobbledick, Johnson, and Snell (Hon. Sec.).

MOTOR POWER FOR CONVEYANCE OF PRODUCE.—Mr. H. F. Johnson read a paper on this subject. [The paper will be again read at the Conference of Hills Branches at Cherry Gardens on the 5th October, and afterwards published in the *Journal*.—En.]

Woodside, August 14.

(Average annual rainfall, 31 in.)

PRESENT.—Messrs. Rollbusch (chair), Disher, Keddle, King, Kleinschmidt, Lauterbach, Sampson, Keen, Newman, and Hughes (Hon. Sec.)

“**JOURNAL OF AGRICULTURE.**”—Mr. G. J. Sampson contributed a critical appreciation of the *Journal of Agriculture*, dealing particularly with the horse-breeding societies scheme outlined by the Director of Agriculture and printed on page 1132 of the July issue. He urged members to read thoroughly the various articles and reports printed from time to time.

SOUTH-EAST DISTRICT.

Kalangadoo, July 8.

PRESENT.—Messrs. Crouch (chair), Riddoch, Earle, Gibb, Kennedy, Tucker, Rake, Morris, Hemmings, Guerin, McCorquindale, and Tucker (Acting Hon. Sec.).

ANNUAL MEETING.—The Hon. Secretary read his annual report, which showed that during the year 12 meetings had been held, with an average attendance of 10. Samples of the undermentioned products were tabled:—Wool, corn, fruit, vegetables, grasses, maize, and also weeds and caterpillars. Papers had been contributed on the following subjects:—"Best Horse for Farm Work," "Poultry," "Preparation of Potatoes from Field to Market," "Summer Fodders and Rye Grasses," "Fattening Sheep in this District," and miscellaneous items of interest were discussed. One homestead meeting was held, and a visit was received from the members of the Mount Gambier Branch.

Kalangadoo, August 12.

PRESENT.—Messrs. D. Tucker (chair), S. Tucker, Earle, Kennedy, Guerin, Mitchell, Orr, Boyce, McCorquindale, Rake, and Sudholz (Hon. Sec.).

MAIZE-GROWING.—Mr. Rake read the following paper on "Maize-Growing":—"South-Eastern farmers should pay more attention to the cultivation of maize, for in parts of the eastern States, where they have a similar climate and rainfall, maize is one of the chief crops grown. The area under this grain in Victoria alone last year was 20,150 acres. On the rich river flats in Gippsland I have seen some enormous crops harvested, the yield ranging from 80bush. to 150bush., and returning the growers from £11 to £15 per acre. Having grown this grain more or less for the last 20 years, I have always found it a valuable addition to the general farm crops. As a fodder crop to be fed in a green state, maize is second only to lucerne, for while maize will yield the heavier weight of fodder per acre, it is deficient in protein compared with lucerne. On the plains near Adelaide I have grown without irrigation as much as 37 tons of green maize to the acre, and with irrigation 50 tons is no uncommon yield. I do not think there is any other plant that will give the dairyfarmer such an abundance of green feed as this. To grow these heavy crops either for fodder or grain, a piece of good land should be selected and dressed with a thick coating of rotten farmyard manure; the land should be then deeply ploughed, and afterwards worked up into a fine tilth. The seed should then be sown in rows not less than 2ft. 6in. apart., and about 18in. between the plants. This wide planting admits of frequent cultivation with the ordinary potato scarifier, for unless the soil is kept constantly stirred between the plants the crop will be a failure. I have known the most successful growers to scarify as often as 13 times during the growing period. In this district I find October a suitable time to plant. The crop will then be ready to cut and feed in February and March, when all natural herbage has dried up. If intended for grain the crop will ripen about the end of May. The cobs when fairly dry should be plucked from the stalk, leaving the husk on the plant; they can then be placed in a crib or light draughty shed where the air can circulate through them. They will soon mature and harden, and are then ready for feeding to pigs, or can be threshed and sold. For fattening hogs I prefer these to any other grain."

Keith, August 3.

ARTIFICIAL MANURES IN WHEAT-GROWING.—In the local hall, on August 3rd, under the auspices of this Branch, Mr. J. M. Hattrick, of Sydney, lectured on this subject. The lecturer explained that if the land was deficient in nitrogen or potash the application of superphosphate might be indefinitely increased without any beneficial result, as that manure contained only phosphoric acid, and excess of that constituent could not compensate for deficiency of either of the others. The only means of ascertaining the most suitable manure to apply was to experiment. Various quantities of super. might be tried, and quantities of potash might be added. The best proportion to try was 1 ton muriate of potash to 4 tons of super. He thought 50lbs. to 70lbs. of the mixture most suitable for the Keith district. He had personally conducted manurial experiments throughout Australia and had found that a mixture of 14lbs. sulphate of potash and 42lbs. superphosphate gave from 2bush. to 3bush. of wheat per acre more than the same weight of super. only. The lecture was illustrated with lantern views.

Kingston, July 29.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. Jackson (chair), Redman, Clarke, Evans, F. W. Barnett, England, Flint, Lloyd, and C. F. Barnett (Hon. Sec.), and two visitors.

CROSS-BREEDING CATTLE.—Mr. Evans read a paragraph from a newspaper showing the extraordinary result secured by a West Australian cattle-breeder by crossing a humped-back Brahmin cow standing eight or nine hands high with a Deerimut Shorthorn bull. Three of the offspring weighed respectively—live weight—6 years old, 2,240lbs.; 5 years old, 1,840lbs.; 4 years old, 1,750lbs.

NOXIOUS WEEDS AND STERILISATION OF SOIL.—Mr. Lloyd read the following paper on this subject:—"I wish to bring before your notice, with a view to having the attention of the Department drawn to the matter, a method which some years ago was claimed to be a great success in eradicating noxious weeds in America, near Washington. The method to which I refer is the steaming of the ground by means of a steam engine to which is attached a set of harrows made of tubular steel. The steam is forced through these into the ground through vents in the points of the teeth, and it is said this not only killed the weeds but the seed as well, and that the land yielded better crops after this treatment. According to a paper read recently at the Gawler River Branch on 'Some Factors in Soil Fertility' it appears that where soil had been partly sterilised its fertility had been greatly increased, and scientists have now explained that this is no doubt due to the presence in the soil of two distinct species of micro-organisms. We have long been familiar with the nitro-bacteria working through the legumes, but now we are introduced to their enemy, the protozoa. Apparently the bacteria are the hardier of the two—though the prey of the protozoa—and when the soil is partially sterilised the protozoa suffers most and the bacteria are left to multiply more rapidly, and so carry on more efficiently their beneficent work. This discovery throws light on some of the hitherto unexplainable things. For instance, the American said the increased fertility was probably due to the destruction of grubs, worms, &c. These, however, are mostly killed by ordinary cultivation. Why is stable manure the fertiliser *par excellence*? Not only because of its organic action; but put into soil where its body is not required it is still very effective, and this, we are told, is because of the large number of bacteria it adds to the soil. Scrub and stubble burning furnishes another instance of the benefit of partial sterilisation. Some time ago the theory was advanced that the value of superphosphate lay more in its anti-toxic action than in its fertilising power; the idea being that plants give off at the roots a poisonous property which is neutralised by the super. Is it likely that the super. is specially destructive to the protozoa? It has been noticed that wherever super. has been used Californian lucerne has come into prominence. This would seem to answer "Yes." In any case where noxious weeds have to be dealt with sterilisation by steam seems to be the most rational method; destroying plant and seed and giving as an offset to the expense incurred increased fertility."

Lucindale, August 12.

(Average annual rainfall, 22½in.)

PRESENT.—Messrs. Rayson (chair), Secker, Rivett, McInnes, Daw, Johnston, McMorrow, Feuerherdt, Beaton, Carmichael, Lanberg, Secker (Hon. Sec.), and five visitors.

BREAKING AND HANDLING HORSES.—Mr. McMorrow read the following paper on this subject:—"The farmer who breeds only one or two foals a year will find it time well spent if he handles his foals when they are six or eight months old. I would not advise him to catch and pet a foal when it is very young, as this often leads to its becoming tricky and mischievous, but take a foal at six or eight months. Catch it quietly with a rope, and use a cavesson and leading rein, but not a bit, and teach the foal to lead about quietly. At first the animal will not go just where it is wanted. Therefore you must go to a certain extent where it wants to go; but it will not take many minutes of quiet pulling to make any horse know what you want, and in an hour's time it ought to be leading splendidly. He also requires to be tied up. For this secure a very strong rope. First run it through the halter of the cavesson under its jaw; then tie securely around the neck. This prevents him from getting the knot of the rope between his ears, which may cause the colt to strangle if you are not near. Secure the rope properly, and never cut it however much the colt may pull or struggle to get away. About three days of this handling, during which time he should be given a little feed, will be quite sufficient at this age, and then when you bring the colt in at the age of two and a half years to start work, it

will soon become quiet. Now put the bit in its mouth, put side reins from the bit to a surcingle round the colt, and rein him up fairly tightly and evenly; otherwise you may mouth it sideways, one side soft and the other hard. This is very awkward in a horse either riding or driving. Keep it moving quietly about the yard or little paddock for an hour or so; then you may loosen him and put on a pair of plough lines, and begin to drive him about. You must go with it to a certain extent until it begins to learn by your quiet pulling what you want it to do. After it has learned to drive about well and quietly you may let it go for that day. The following day the colt may be ridden if of a light breed. Care should always be taken to get the colt to stand quietly when first mounting. Always try to get the colt to stand after you have mounted it, and get up and down several times before letting it move at all. Then let it move off quietly, and try to prevent it from bucking, if possible. Remember you are educating it to do what you want it to do, so letting it buck when you can prevent it is educating it to do what you do not want it to do. After a few days it can be started for harness if wanted for that purpose. For this use a pair of long traces, and sledge the horse well till you get it perfectly tractable, to stand anywhere you want it to do, and start when you ask it to. This may take some days; it just depends on the temper of the horse. Then put it in a cart and drive off quietly. A horse broken in and taught to work straight away by itself always makes the handiest and best worker on the farm. A draught horse should be treated the same way as a light one for harness to make a handy horse of it. To take a colt that was not handled when a foal: First you require a strong and high yard, so that you can put the colt in by itself. A round yard is always best. Run the colt in and rope with a light roping stick. Keep him moving around the yard with the rope hanging loose around the neck. Pull up gradually until the colt feels it tight, keeping him moving all the time. After a little while the colt will stop and come towards you. Then have a man to keep a steady strain on the rope, and you can put the cavesson on without much trouble. Put the leading rein on the nose ring, and move him about quietly. Then begin to handle the colt all over from ear to tail. This can be done without any danger by taking the roping rope, put one end round the neck, fasten it loosely and so that it will not slip, pass the length of rope round the near hind fetlock and back to the collar rope, draw the leg forward till swinging off the ground, and fasten the rope securely. This is the finest way to hitch the wildest of colts so that you can get about it without fear of danger either to it or to yourself. To finish it off go through the same process as advised before, from a foal to a broken horse, and remember a colt is a colt until it has been broken in for at least six months. A steady nerve is essential when you go to a young horse, as he very soon knows when you are nervous and afraid. You must treat and work him according to his temper, and practical experience is necessary to learn the different tempers of the horse. When teaching a young horse to lead, do not go ahead and pull it, but keep well back from the shoulder and make the horse go ahead. This makes a good leader of it in a very short while. Never use too much whip with a young horse, but when you use it for driving take a stockwhip and use it properly for a cut or two. Never use a whip lightly. If you want to tie up a horse on an open plain where there is neither fence nor tree, tie a knot near the end of your reins and buckle it around the fore fetlock. A pair of hobbles is a splendid thing to use to teach a young horse to stand and be caught out in the open paddock, and they are also splendid to put on a horse that will not stand to be put in harness. No horse if properly handled from the beginning should be an outlaw or jib, as this only comes from bad management, and the breaker giving in to the horse instead of the horse being compelled to give in to the breaker."

Millicent, August 8.

(Average annual rainfall, 28½ in.)

PRESENT.—Messrs. Mutton (chair), Holzgrefe, Oberlander, Bowering, Mullins, Gray, Serle, and Day (Hon. Sec.).

PLoughs and PLOUGHING.—The following paper was read by Mr. H. F. L. Holzgrefe:—"During the last 50 years wonderful improvements have been devised in the implements used for the purpose of stirring up the soil. In this paper I will only refer to the ploughs mostly in use in our district. First we have the set ploughs of various makes and names, which are the best in clear land, where you have no roots, stones, or other rubbish. With them a good ploughman can do the best work. They do clean ploughing, provided the mouldboards are not too short. The next oldest plough is the stump-jump—a very useful implement in rough land. It has done and is doing good service at the present time in our State. A lot of land would never have been cultivated but for this plough,

but it is not very much used in the South-East. Another plough coming into use a good deal in the South-East is the disc plough, useful in ferny (bracken) or stubble land, where the soil is not sticky. It gets over stones and other rubbish very easily; it is very light in draught, and good for destroying weeds. Of course, the different ploughs mentioned by me are made with from one to six furrows, or even more. You can get them according to your order or the strength of the farmer's team to pull them. Thus we have a great variety to select from. I prefer the set plough in good land free from stones and roots. As we have not too much good land in the South-East, if it is worth ploughing at all it ought to be well ploughed—for grain or other crops. Weeds gain very fast on our land, and unless the ploughing is well done it is better left alone. Four to five inches deep and 9in. to 10in. wide is a good furrow for the best land. This gauge is mostly used at our ploughing matches, and looks splendid if properly done. Of course, every farmer ought to know his own land best, and the depth to plough. Referring to the Millicent and Mount Gambier districts, I have always found that those farmers who plough their land well always come on top in results. It is better to put in 50 acres well done than 100 acres scratched over. A good plough is of very little use unless you have a good man with it. Ploughing matches have done a lot of good in teaching our young men to take an interest in good ploughing. The system now adopted by some farmers, of starting on the outside of the whole paddock, or part thereof, and ploughing round and round till finished, has its advantages and disadvantages. If you continue, year after year, ploughing in this way your land will get higher on the headland near the fence and drains, and in wet years there is trouble to get off the flood water. But if ploughed in one or two chain "lands" (or more), the furrows you leave when finishing lands are useful, if opened at the ends, to let off the flood water on some of our wet land, and in wet winters." Mr. Mullins agreed that ploughing was not of much use unless it was done well. It was a great mistake, also, to plough round the paddock and finish in the centre. Mr. Holzgreffe said that was all right in drier country. In the South-East, however, one day's flood water on a crop just when the seed was germinating would ruin the whole crop. The Chairman had noticed some land on the Wyrie where two ploughs had been used. One turned the sods on edge and the other turned them completely over. The result could be seen in the weeds, which grew profusely on the edged sods, while the other portion of the land looked well. Mr. Holzgreffe did not think it advisable to use the stump-jump plough on the flats. If the land was ploughed thoroughly in the first place it was much easier to work it afterwards. He recommended even ploughing, say 4in. to 5in. deep, and taking furrows 9in. wide for the Millicent flats. The stump-jump plough was made for the mallee country, where it was, of course, necessary, but the set plough was the best for clear land, and better than a disc. He did not favor what was termed rough ploughing, and thought the scarifier of little use during the winter. Mr. Mullins asked how it was possible to work land for late barley crops otherwise. Mr. Holzgreffe replied that by ploughing thoroughly in the dry weather, and harrowing at intervals during fine autumn weather, before the weeds had obtained a strong growth, little trouble would be experienced. Mr. Bowering favored deep ploughing and narrow furrows for the heavy land; in some localities, however, that method would be a failure. Mr. Gray remarked that he had ploughed some loamy land which previously was infested with ferns. This year was the fifth under cultivation, and the results had been very satisfactory.

IMPORTED GRASSES.—A short discussion on imported grasses followed. Mr. Serle said he had attempted to destroy blue Kentucky grass by means of several ploughings without success. Mr. Gray advised summer ploughing. It was mentioned that rye grass required a firm soil. That was the reason why it flourished on the roads.

Naracoorte, August 12.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Wright (chair), Coe, Williams, Loller, Rogers, Caldwell, Lange-luducke, jun., and Schinckel (Hon. Sec.).

FARM VEGETABLE GARDEN.—Mr. S. H. Schinckel read the following paper on this subject:—"The farm vegetable garden should be a very pleasing attraction on every farm all the year round. On some farms that is so, while on others it is very conspicuous by its absence. Why this is so it is hard to say. Is it because people on such farms do not like vegetables? Or is it that they cannot grow them? Or are they always too busy doing something of far greater importance? Or are they discouraged through the destructiveness of slugs, &c.? There is no doubt various reasons for this absence may be

given, but that does not alter the fact that a well-kept vegetable garden should be on every farm. It is a good asset to the farm. We all know that vegetables are very good, healthy food for the household. The waste portions are very good for pigs, poultry, &c., so they must save other items of expenditure. The person who wishes to be successful in growing vegetables must have a liking for the work, just the same as the most enthusiastic footballer or cricketer, &c., has for his recreation or pastime. Footballers and cricketers have their disappointments, but are not discouraged. Vegetable-growers also meet with disappointments, but they should persevere and try to prevent disappointments. Good attention to the farm vegetable garden is a profitable and useful recreation. It is useless being half-hearted in this matter. You must work consistently and thoroughly at every favorable opportunity—not necessarily making it laborious. But do not, however, allow less important recreation to take you from your work. There certainly are times when persons on the farm should witness or have some more amusing recreation—particularly the younger man. But are not some of our younger men (the farmers' sons) becoming too fond of amusing recreation for their own benefit. I think some may with advantage to themselves split the difference. A little more attention and time for vegetables, and a little less for more amusing pastime. The vegetable garden certainly improves the attractiveness of the home. It greatly increases the love for home. Picture the person with his nice flower garden. Do you find him always anxiously waiting to walk down the streets to see what is going on as soon as he has finished his regular daily work? I think not. He is generally more contented admiring and seeing what he might be able to do in helping nature to improve its beauty. This also applies to the person who takes some little pride in his vegetable garden. I do not wish to say one word against the market garden, but vegetables from your own garden are always fresh, and therefore more palatable than those secured from another source. The love for the farm vegetable garden undoubtedly cultivates a longing for good books. I think it possible at times that the farmer (young or old) receives quite as much pleasure and reward for his leisure hours in any kind of gardening as he would from various kinds of recreation." Mr. Bray thought that every farmer should at least grow sufficient vegetables for his own use. Mr. Rogers agreed with the views expressed in the paper. It was a great pity that so little attention was paid to farm vegetable gardens. It was a great help in assisting in economy. They had the land, and the least a farmer could do was to raise his own vegetables. Mr. Coe also spoke favorably of the paper, and it was just the right time to look after the garden and get it stocked. He confessed that it was not easy to bend the back to digging, but, nevertheless, young men should be encouraged to take an interest in gardening. It was a fine hobby, which could be made to bring grist to the mill. Mr. Loller was surprised to see farmers in the North pay so little attention to gardening. Farmers should at least grow sufficient for their own use. Vegetables were very healthy, and they should be more used than meat.

VEGETABLE NOTES FOR AUGUST.—Mr. Schinckel then read the following paper on "Vegetable Notes for August":—"Probably at this time of the year slugs are the greatest annoyance that the vegetable-grower has to contend with, more particularly in older gardens that have been liberally treated with farmyard manure. The best method that I know of to keep these pests in check is not to allow too much rank grass or herbage to grow, as they are usually found under this in large numbers. An occasional digging to stop rank growth is a good preventive. Slugs, like other pests, must have something to live on, and if this rank growth, which is common in most gardens, is prevented from providing shelter and food they have to go short or seek pastures new. I do not like planting young vegetables on freshly dug ground, which was carrying a heavy growth of herbage previously, as the slugs invariably come to the surface shortly after, and then it is 'good-bye, plants.' Another good method I have practised in preventing slugs from attacking young plants is a liberal dressing of gypsum. There should now be steady planting out of cabbages on well-prepared ground, about 2ft. apart. Around each plant, immediately after planting, put a good handful of gypsum, and as soon as the plants have recovered the change from the transplanting, give the whole bed a liberal top dressing of short stable manure. Old manure is best for this, as you have less weeds to contend with. When weeds do appear do not neglect the hoe. The same treatment applies to cauliflowers, but they require a little more room. Carrots and parsnips may be sown now on fine, deep, well-prepared soil. It is best to dig the ground a week or two before needed; then work down fine with a hoe. Seed must not be sown deep or too thick. Cover with a light mulch of old manure, look out for weeds, and attend to thinning. Turnips should be sown at intervals. The soil need not necessarily be very rich; otherwise the treatment is the same as for carrots. Sow lettuce on firm soil, and thin when large enough. Small beds of radishes should be sown fortnightly. Sow red beet on fairly rich soil, about

1 ft. 6 in. between the drills; thin when large enough. Peas and broad beans may still be sown, though for beans it is getting somewhat late. Onions should be planted now, as these are very slow-growing for a time. It is very important that they should be kept free from winds. There are many other kinds of vegetables that may be sown now, but I have only referred to those I have been growing myself. It must not be forgotten that to grow the best of vegetables they must be grown quickly, and the free use of the hoe on sunny days will greatly help one to do this. Have a good system of working, keep all plants in rows as far as possible, and if the vegetable garden is laid out in beds it will give a better opportunity for rotation." Mr. Loller said he did not know that gypsum was an antidote to slugs. He would like to know if Mr. Schinckel had tried lime as well as gypsum. Mr. Schinckel said he had tried lime, but he found that after a heavy dew it was of little value in preventing slugs from attacking vegetables. Gypsum was more effective and could be said to be a preventive; he just dropped the gypsum round the plant. A discussion then took place on the application of lime to the soil. Mr. Schinckel said application of lime made plant food more readily available. He had never known less than 6 cwt. to the acre used. In some cases he had known half a ton to the acre used. He had found in growing vegetables that the slugs were worse on soil where large quantities of manure had been applied.

GERMINATION OF WHEAT.—Mr. Rogers had difficulty with the germination of wheat seed this year. A quantity had not come up, and he did not know whether to attribute it to some peculiarity about the season or to treating the seed with too strong a solution of bluestone. Members generally attributed the non-germination to too much moisture in the ground when sown. Farmers should be careful in sowing too soon after heavy rain. In some cases the wheat malted, and in others the germ of the seed perished through being too cold. Mr. Coe pointed out that the drill destroyed a lot of seed when it was being put in. Those using the drill should be careful to see that it worked properly.

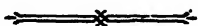
Penola, August 5.

(Average annual rainfall, 26½ in.)

PRESENT.—Messrs. Richardson (chair), McKay, Peake, McDonald, Warner, Adamson, Strong, Norman, Miller, Darwent, and Ockley (Hon. Sec.).

MAINTAINING FERTILITY OF SOIL.—The Hon. Secretary, Mr. Ockley, read the following paper:—"One cannot help noticing that in this district of fairly high rainfall, wherever the soil is rich in humus it can hold a considerable amount of water without becoming supersaturated. This quality is essential to reap satisfactory results from autumn and winter sown crops: whereas, where it is deficient it soon gets into a water-logged state, and can only produce payable crops of cereals in comparatively dry years. Therefore it is of the utmost importance that whatever humus the soil contains in its virgin state should be maintained; and on no account decreased by continual cereal cultivation and the selling of the produce off the farm, as has been the case in several districts of similar rainfall and climatic conditions in Victoria. Soil that is thus allowed to become depleted of its humus gradually becomes less valuable, with regard to production, and requires a great deal of expense to restore it to its original condition whereas if a rational rotation, involving the feeding of fodder crops to live stock, be observed from the beginning, the land will be periodically restored to its original fertility, at the same time making a profit. As there is such a wide range of fodder crops which can be successfully grown, no hard and fast rules for rotation can be laid down, and I have never heard of any particular system being specially applicable to this district. For the South-East in general, Professor Perkins suggests the Norfolk four-course rotation, which consists of: *First Year*—Turnips, which could be replaced by swedes, mangels, potatoes, or kale. *Second Year*—Barley or oats. *Third Year*—Red clover, beans, or peas. *Fourth Year*—Wheat. It is most probable that such a course would be eminently suitable, and would be the means of the constant employment of labor all the year round. This would, in a measure, lessen the great outcry of the scarcity of labor at harvest time. In fact, such constant employment would tend to make labor cheaper, as a man can afford to work for less per day if constantly employed. The great drawback to the profitable utilisation of the fodder crops for sheep and lamb fattening is the cost of the railage to Adelaide, and the time taken between the farm and sale yards; and in view of the magnificent possibilities in this direction of the district, it is a pity that the farmer is so hampered. When the South-East has a port and freezing works of her own there is nothing to prevent her exporting as much frozen mutton and dairy produce as New Zealand. However, whether the fodder crops

bring in a direct substantial profit or not, it is absolutely essential that they should be grown, if the farmer wishes to keep his land in the same or better condition than it was originally. In discussing the subject, the majority of members agreed that a rational system of rotation would have to be observed; but, as this district was practically new so far as agricultural pursuits were concerned, the most suitable system had yet to be discovered. Wherever a tree had been rung the humus caused by the decaying leaves and bark made the ground firmer, and it was less affected by heavy rains. Especially was this noticeable where the tree stood in ground liable to become waterlogged by incessant rain. The Hon. Secretary thought the district eminently suited to the growth of clovers and maize, and considered that more attention could with advantage be given to their cultivation.



TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of 3,500 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Lowrie Scholarships.

All sections of the community and producers especially will be pleased to learn that an anonymous donor has paid to the University of Adelaide the sum of £500 for the purpose of providing scholarships for post graduate research in agriculture. It is the wish of the donor that these should be called Lowrie Scholarships, in recognition of the valuable services rendered to agriculture by Mr. William Lowrie, formerly Professor of Agriculture at Roseworthy and now Director of Agriculture. The University proposes to give in succession seven scholarships, each of £75, and tenable for one year, to be called the Lowrie Scholarships. Candidates must have qualified for the B.Sc. degree in either the special course in agriculture for that degree, the course for the honors degree in chemistry, or the course for the ordinary degree in either chemistry and physics or chemistry and physiology. A candidate must have attended regularly a course in botany to be approved by the Council, and the course of bacteriology required for the third year in medicine. A scholarship will be awarded in December of each year, on the recommendation of the Faculty of Science, to the best candidate, provided he is of sufficient merit. The faculty will, in making any recommendation, take into consideration the whole undergraduate course of the candidate, and will attach special weight to evidence of capacity for original research. The holder of the scholarship will be styled the "Lowrie scholar." Modifications may be made in the conditions of the scholarship, but the name and general object are not to be changed.

Farmers at Roseworthy College.

The interest being taken in the work being done at Roseworthy College was again evidenced on Monday, September 18th, when 350 producers accepted the invitation of the Minister of Agriculture (Hon. J. P. Wilson, M.L.C.) to attend the annual inspection of the College and grounds. In addition to the Minister there were present the Director of Agriculture (Professor Lowrie), the Principal of the College (Professor Perkins), and other officers of the department. The visitors were conducted over the College buildings and the various sections of the farm, including the poultry section, no effort being spared by the Principal and his assistants to make the inspection as interesting and instructive as possible. This year the provision of luncheon was entrusted to a caterer, and the innovation apparently met

with general approval. In connection with the visit it may be as well to remind members of the Agricultural Bureau and farmers generally that small parties can visit the College at any time by arrangement with the principal, and that members of the Bureau can obtain excursion fares on the railways by applying to the department for certificates.

New Lands.

Land in the hundreds of Rudall, Moody, Boothby, and Hutchison, on Eyre's Peninsula, which with other miscellaneous lots comprise in all an area of about 168,000 acres, is open for application until November 14th. A total of 220,000 acres in the hundreds of Smeaton and Pascoe, on the Darke's Peak line, and in the hundred of Travers, north-east of Venus Bay, will be gazetted probably within the next three months. North-east of Tailern Bend, on the authorised railway line to Brown's Well, a total of 160,000 acres will be gazetted in four or six weeks' time. Surveys will be proceeded with along the line, and the land will be offered as these are completed. There are now four survey parties engaged on that line; six parties are at present at work in Eyre's Peninsula, and it is probable that four or five additional parties will be placed in the field very shortly.

Apiculture.

Though South Australian honey has gained a high reputation on account of its purity and general excellence, the beekeeping industry is still a long way behind what the natural advantages enjoyed warrant. In order, therefore, to encourage and assist beekeepers and stimulate the industry generally the Agricultural Department notify that they are prepared to make arrangements with the secretaries of agricultural and horticultural societies for a limited number of lectures and demonstrations with live bees to be given at shows. The advantages to be derived from the proposed lectures and demonstrations are self-evident, and are sure to be widely appreciated. Secretaries of shows are therefore advised that applications in connection with the matter should be made as early as possible to the Director of Agriculture, Adelaide.

Opening of the Wool Season.

The first of the local wool sales of the 1911 season was held in Adelaide on Thursday, September 21st, when over 23,500 bales were offered, this total being nearly 5,000 bales behind the number offered at last year's opening sales, which constituted a record. Prices realised show a decline on an average of 10 per cent., but this to some extent was counterbalanced by the fact that the Northern wool especially carries more condition than that of the previous

year. Generally the quality was somewhat finer than last year. The following figures show how the quantity of wool offered and sold compares with the quantities at the opening sales of the previous five years :—

Year.	Offered.	Sold.
1907	20,372	19,863
1908	22,542	20,802
1909	17,012	16,124
1910	28,276	24,445
1911	23,505	21,982

North Bundaleer Estate.

The Government have decided to purchase the North Bundaleer Estate, comprising between 23,000 acres and 24,000 acres, from Mr. G. E. Maslin for £6 10s. per acre. The estate is located between the Bundaleer reservoir and Jansestown, and its acquisition by the Government for the purposes of closer settlement was strongly recommended by the Land Board and the Surveyor-General. The greater portion of the property, which has belonged to the Maslin family for over 30 years, is stated to be admirably adapted for farming, the remainder being first-class grazing country. The estate is well watered, and is provided with a useful supply of timber for fencing and other purposes.

Market Prospects for Lamb and Butter.

In his report, dated London, September 1st, the Acting Trade Commissioner (Mr. J. B. Whiting) states — “ With further reference to my remarks in previous reports I may say that the general impression is that butter (though temporarily comparatively weak) will maintain very satisfactory prices. The prospects for lamb are not quite so assured. Though the very dry season throughout Europe has resulted in a considerable falling off in the natural increase, it is thought that owing to the absence of feed a very large quantity of both sheep and cattle will have to be sold as well on the Continent as in Great Britain, and that this supply above the normal of meat will tend to keep prices fairly level this coming season. If this turns out to be the actual state of things it seems to be certain that in the following season prices must be high, because of the general shortage due to the killing this season of a very much higher percentage than usual of breeding stock. The market for pork is fairly firm, Dutch being quoted at about 6d. for light weight and 5d. for heavy. There is no quotation for Australian, but it is probably worth about 5d.”

Departmental Exhibits at Country Shows.

The value of the Agricultural Department's wheat and poultry exhibits as a source of interest and instruction at country shows is becoming more generally recognised. The result is that during the present year more requests for the exhibits than can be complied with have been received. The exhibits will, however, be sent to as many shows as possible.

Peruvian Lucerne.

The Department of Agriculture has imported a quantity of Peruvian lucerne seed, parcels of which can be received from the department at cost price, viz., 1s. 6d. per pound. The seed was imported on the recommendation of Mr. S. McIntosh (Director of Irrigation), who has had considerable experience with this variety of lucerne on the swamp lands of the Murray.

The Wheat Crop of the World.

Writing on August 11th, *Beerbohm's Evening Corn Trade List* states—
“The total estimated wheat crop of the world this year is 438 million quarters (480lbs.). This is a large quantity, and quite equal to the estimated requirements, but at the same time, considering the large increase in the area sown in the United States, is very disappointing, and much smaller than expected two or three months ago. The world's total of 438 million quarters is six million quarters smaller than last year, and one million quarters less than that of 1900. The world's consumptive requirements of wheat, owing to the larger population, are appreciably increasing every year, and it is fortunate that the crops of 1909, 1910, and 1911 have been such large ones. . . .”

Inspectors of Orchards.

The Director of Agriculture is inviting applications for four positions as inspectors in country districts under the Vegetable Protection, Hay and Chaff, Fruit, and Fertilisers Acts. Applicants must be under 45 years of age, and will be required to submit themselves to a written and oral examination upon elementary entomology and vegetable pathology, including the life histories of common insects and fungus pests of the orchard and garden, as well as the most improved methods of prevention adopted in orchard practice. The salary is fixed to commence at £156 per annum and allowances to cover all travelling expenses, £150 per annum.

A Carniolian Queen Bee.

Apiarists will be interested to know of the safe arrival in South Australia of a Carniolian queen from Ljubljana, in Austria. For some time past Mr. R. McDonald, a well-known apiarist of this State, has been of the opinion that the Carniolian strain of bee might prove useful in South Australia. He accordingly made arrangements through the Inspector of Apiaries for the importation of a queen bee from the above district. Posted on July 9th, the journey took exactly five weeks. On opening up the package the queen and her attendant bees were apparently quite dead. They were warmed up in an oven on the remote chance that life might be resuscitated. After three-quarters of an hour the queen alone showed signs of life, and the treatment was continued. On the following day she was safely introduced to a nucleus hive. Mr. McDonald believes that this bee will prove very useful when once acclimatised, and he intends to thoroughly test her merits at his apiary at Warunda Creek.

Fruit Grading and Packing.

At the recent Conference of the Western Australian Fruitgrowers' Association it was resolved—"That a committee be appointed by the association to draw up the best methods of grading and packing of fruit for export with a view to the Government providing instructors of those methods." The mover of the motion, who has had considerable experience in Californian packing houses, warmly advocated the packing of fruit by number instead of by size.

The Soya Bean.

As a subject of considerable discussion, the Soya bean has occupied a good deal of attention lately in very widely extended circles. The advantages of this crop for many purposes have been fully dilated upon, and the more it has been studied the more it seems to impress itself as one of the coming crops of the future. . . . One of the great needs of the whole of South Africa is what may be described as new crops. That is, something to vary the usual monotony of the field crops of the country, and enable us to adopt some more economic methods of cultivation than is generally in vogue. In this direction the Soya bean promises to prove helpful, for while it is apparently a commercial crop of some value for oil, with apparently an assured market for soap-making and other purposes, it is also of value as a rotation crop for maize—*South African Agricultural Journal*.

Increasing the Durability of Timber.

Of the various methods that are practised for increasing the durability of timber that which occupies the foremost place is the application of creosote. This substance owes its efficacy to the fact that it is a virulent plant poison, so that wood which contains a considerable quantity of creosote is more or less completely protected against the attack of decay-inducing organisms such as fungi. . . . Creosote also acts as a preservative to some extent owing to the fact that it displaces air and water in the tissues of the wood, and these are essential to the process of decay.—*Journal of Board of Agriculture.*

A Rule for Feeding Cows.

Each cow should receive as much roughage as she will eat up clean, and a portion of this should preferably be of a succulent nature, like grass, silage, soiling crops, or roots. Of concentrates it has been found a good working rule to feed as many pounds of grain feeds per day to each cow as she produces pounds of butter fat a week, or one-fourth to one-third as much grain as she gives pounds of milk daily, the amount depending upon the percentage of butter fat in the milk. In the case of cows producing milk with a low percentage of fat, one-fourth would be required. Care should always be taken to avoid an increase in body weight above the normal for each cow, since the milk secretion, as a general rule, is likely to suffer when cows commence to utilise their feed for the formation of body fat.—*Bulletin 200, Wisconsin Experiment Station.*

Imports and Exports of Fruits and Plants.

During the month of September, 12,180bush. of fresh fruits, 879 bags of onions, 3,758 bags of potatoes, and 20pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 96bush. of bananas (chiefly over-ripe) and 120 bags of potatoes were rejected. Under the Federal Commerce Act 2,080 cases of fresh fruit, 117pkgs. of preserved fruit, 626pkgs. of dried fruit, 55pkgs. of honey, and 1pkg. of plants were exported to oversea markets during the same period. These were distributed as follows:—For London, 50pkgs. honey, 12pkgs. preserved fruit, and 1pkg. plants; for Germany, 5pkgs. honey; for South Africa, 286pkgs. dried fruit; for India, 105pkgs. preserved fruit; for New Zealand, 340pkgs. dried fruit and 2,080pkgs. citrus fruit. Under the Federal Quarantine Act 545pkgs. plants, seeds, bulbs, &c., were admitted from oversea sources.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the enquirer must accompany each question. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

TREATMENT OF MARES IN FOAL.

"V. X.," Penola.—If you send your name and address, a reply will be sent to your questions.

DEFECTS IN APPLES.

"P. J. C.," Wirrabara.—The apples left at the office of the Horticultural Instructor are damaged in three ways—(1) Dry brown areas are present in the pulp, having all the characteristics of the bitter pit defect. (2) The black spot fungus (*Fusicladium dendriticum*) is present in large and small patches. Many of the brown decaying spots noted upon the skin are due to a late growth of this fungus, as the spore-bearing hyphæ demonstrate. (3) There are other small brownish spots where the skin has become decomposed, and blue mould (*Penicillium*) has effected a lodgment. It would appear as if these last-named patches are mainly to be accounted for owing to the fact that the fruit has reached that stage of ripeness when its chemical constituents change into compounds which in themselves either tend to break up the structure of the apple directly, or by facilitating the operations of other elements and organisms permit such a result.

MANGE IN HORSE.

"J. H.," Clare writes—"I have a mare suffering from a skin disease. It starts in the form of a fester, which dries up in a few days, and then the hair comes off. Can you advise a remedy?"

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"I would recommend the owner to apply the following lotion:—Sulphur, 3ozs.; oil of tar, 3ozs.; raw linseed oil, 6ozs.; mix. Wash the affected parts well with soap and water, dry, apply lotion, rubbing well in, leave for

three days, wash off, dry, and re-apply. Two applications usually suffice. As the skin disease is contagious, the affected animals should be kept away from other horses, and the harness should be thoroughly washed with hot water."

LIQUEFYING CANDIED HONEY.

"A. A.," Gilberton, asks—" (1) The best means to adopt to liquefy candied honey. (2) If the tins of honey are placed in a water bath and the water allowed to boil, is it possible for the honey to become burnt so long as I keep the bath well supplied with water? I ask this question as I have heard it asserted that the honey can be burnt in this manner; in fact, the assertion was that if the water only comes to boiling point the honey will be burnt. Is that so? I should be pleased to hear what Mr. Whitelaw has to say about this. (3) What effect does the liquefying of candied honey (by placing the tin in a water bath) have upon the color and flavor of the honey?"

Answer—" (1) The various methods adopted to liquefy candied honey are— (a) A hot air chamber; (b) a steam tank; (c) by heating in water. (2) By placing the tins in water on pieces of timber lin. in thickness, and applying heat, the honey will liquefy. The tins must be quite watertight, and the water level should reach to two-thirds the height of the tins. Honey should not be heated much over 160° F., as there would be the danger of impairing both flavor and color. A lower temperature is safer, but would be slower. On no account should the honey reach boiling point (212° F.), as a burnt flavor would be the consequence. (3) When candied honey is liquefied there is usually a slight chemical change in its composition, and it usually attains a higher density. When overheated during the process the flavor is changed, and it becomes darker in color. This is due in some instances to the splitting of the minute grains of pollen contained in the honey."



JERSEY COWS.

ROSEWORTHY AGRICULTURAL COLLEGE.

Experiments Relating to the Depth of Sowing of Some Agricultural Seeds.

By ARTHUR J. PERKINS (Principal Roseworthy Agricultural College) and
W. J. SPAFFORD (Assistant Experimentalist).

In 1903—a year particularly disastrous to the College crops—the failure of portion of the wheat crop was, rightly or wrongly, attributed to unduly deep sowing. This mishap formed the starting point of a series of experiments bearing on the subject, which were carried out by us in 1906, 1908, and 1909. We cannot pretend that we have dealt with this question at all exhaustively; we did not, for instance, submit seed to what might be termed adverse conditions of germination. Our object may be described as, given a soil in good average seeding condition, what depths of sowing are likely to prove best suited to various agricultural seeds. We now submit the result of three years' trials, in the belief that some of the conclusions to be derived from them may prove of value to others.

WHEAT.

Wheat was tested in both light sandy soil and rather heavy loam. We shall submit first the results secured in sandy soil.

WHEAT IN SANDY SOIL IN 1906.

The wheat was sown at depths running from $\frac{1}{2}$ in. to 6 in., with $\frac{1}{2}$ in. intervals between them. In 1906 we sowed only 10 grains of wheat at each depth. We came eventually to look upon this number as insufficient for our purpose, and raised it to 50 in succeeding years.

The grain was sown on June 5th. How it germinated is shown in Table I. :—

TABLE I.—*Showing Germination of Wheat Sown in Sandy Soil at Various Depths in 1906.*

Depth of Seeding.	Germination Order and Numbers.								Total Number Germi- nated.
	June.								
	12	13	14	15	16	17	18	19	
$\frac{1}{2}$ in.	6	—	2	—	—	—	—	—	8
1in.	6	3	—	—	—	—	—	—	9
$1\frac{1}{2}$ in.	—	3	2	1	—	1	—	—	7
2in.	—	—	3	1	—	1	—	1	6
$2\frac{1}{2}$ in.	—	—	1	2	1	2	—	—	6
3in.	—	—	—	4	2	4	—	—	10
$3\frac{1}{2}$ in.	—	—	—	2	4	3	—	—	9
4in.	—	—	—	—	1	5	—	—	6
$4\frac{1}{2}$ in.	—	—	—	—	1	6	1	—	8
5in.	—	—	—	—	1	7	—	—	8
$5\frac{1}{2}$ in.	—	—	—	—	—	4	—	2	6
6in.	—	—	—	—	—	1	2	1	4

Of the plants that germinated it was noted on August 29th that those from seed sown $\frac{1}{2}$ in. deep looked rather sickly; those from seed sown 1in. deep were somewhat healthier looking; whilst at the time the finest plants were from those sown $1\frac{1}{2}$ in. to 2in. deep. Those sown at greater depths were weaker in proportion as the depth of sowing increased. By October 9th plants from seed sown from $\frac{1}{2}$ in. to $3\frac{1}{2}$ in. inclusively had fully developed ears, whilst plants sown at greater depths were only just coming into ear.

No record could be kept of the grain produced, as unfortunately birds destroyed the greater portion before it came to maturity.

WHEAT SOWN IN SANDY SOIL IN 1908.

The grain was placed at the same depths as in 1906; but instead of 10 grains for each depth 50 grains were sown. The seed was sown unpickled on June 11th. Germination results are shown below in Table II. :—

TABLE II.—*Showing Germination of Wheat Sown in Sandy Soil at Various depths in 1908.*

Depth of Seeding.	Germination Order and Numbers.															Total Number Germinated.	
	June.										July.						
	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4		5
$\frac{1}{2}$ in.	17	26	5	—	1	—	—	—	—	—	—	—	—	—	—	—	49
1in.	—	34	4	5	1	2	—	—	—	—	—	—	—	—	—	—	46
$1\frac{1}{2}$ in.	—	23	13	5	5	—	—	—	1	—	—	—	—	—	—	—	47
2in.	—	—	9	15	14	8	—	—	—	—	1	—	—	—	—	—	47
$2\frac{1}{2}$ in.	—	—	1	4	19	17	2	1	2	—	2	—	1	—	—	—	49
3in.	—	—	—	—	10	21	13	2	—	—	—	1	—	—	—	—	47
$3\frac{1}{2}$ in.	—	—	—	—	2	14	16	5	—	—	2	1	2	—	—	—	42
4in.	—	—	—	—	—	9	12	5	9	—	5	2	1	—	1	—	44
$4\frac{1}{2}$ in.	—	—	—	—	—	2	6	5	16	5	6	2	1	—	—	—	43
5in.	—	—	—	—	—	—	2	2	13	7	8	3	—	—	1	1	37
$5\frac{1}{2}$ in.	—	—	—	—	—	—	—	3	6	5	10	15	4	3	1	—	47
6in.	—	—	—	—	—	—	—	—	4	—	17	12	7	1	—	2	43

Plants from seed of all depths came into full bloom uniformly on October 16th. Again no record could be kept of the grain, as birds destroyed it before maturity.

WHEAT SOWN IN SANDY SOIL IN 1909.

Fifty grains of wheat were sown at the same depths as in preceding years—on May 25th ($\frac{1}{2}$ in. to $2\frac{1}{2}$ in.) and on May 26th (3in. to 6in.). Germination results are shown below in Table III. :—

TABLE III.—*Showing Germination of Wheat Sown in Sandy Soil at Various Depths in 1908.*

Depth of Seeding.	Germination Order and Numbers.																		
	June.																		
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
$\frac{1}{2}$ in.	1	—	—	1	—	—	—	2	2	1	3	16	—	2	5	8	2		
1in.	—	—	—	1	—	1	2	2	11	4	4	14	—	2	3	—	1		
$1\frac{1}{2}$ in.	—	—	—	—	4	1	2	1	8	3	7	9	2	1	1	2	—		
2in.	—	—	—	—	1	2	5	3	8	5	6	4	2	1	1	1	1		
$2\frac{1}{2}$ in.	—	—	—	—	5	—	1	1	5	7	7	4	2	1	—	3	—		
3in.	—	—	—	—	4	—	2	—	—	6	3	2	3	1	3	4			
$3\frac{1}{2}$ in.	—	—	—	—	—	1	1	1	2	3	3	4	—	—	2	6	1		
4in.	—	—	—	—	—	1	—	1	2	1	5	4	3	2	1	3	2		
$4\frac{1}{2}$ in.	—	—	—	—	—	—	—	1	—	1	3	3	1	2	—	4	1		
5in.	—	—	—	—	—	—	—	—	1	—	1	1	1	4	1	5	3		
$5\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	3	3	1	—	3	—	3	1		
6in.	—	—	—	—	—	—	—	—	—	5	1	—	2	—	2	2	1		

Depth of Seeding.	Germination Order and Numbers.															Total Number Germinated.			
	June.																July.		
	20	21	22	23	24	25	26	27	28	29	30	1	5	6					
$\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	43				
1in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	45				
$1\frac{1}{2}$ in.	—	—	—	—	—	—	1	—	—	—	—	—	—	—	42				
2in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	40				
$2\frac{1}{2}$ in.	—	2	—	—	—	1	—	—	—	—	—	—	—	—	39				
3in.	—	—	1	—	—	1	—	—	—	—	—	—	—	—	30				
$3\frac{1}{2}$ in.	—	1	1	—	—	—	—	—	—	—	—	—	—	—	26				
4in.	1	—	—	—	—	1	1	—	—	—	—	1	1	—	30				
$4\frac{1}{2}$ in.	4	4	1	—	—	—	—	—	—	—	—	—	—	—	25				
5in.	1	2	—	—	—	—	—	—	—	—	—	1	—	—	21				
$5\frac{1}{2}$ in.	—	1	—	—	1	—	—	—	—	—	—	—	1	—	17				
6in.	—	2	3	—	—	—	—	—	—	—	—	—	—	—	18				

This wheat was sown in a field in which the greater portion of the crop died off from blighting off or takeall; and although we were able to collect the grain that matured in this experiment, it will serve no purpose to quote

it, as the majority of the plants under experiment died back under similar influences.

SUMMARY OF THE GERMINATION OF WHEAT IN SANDY SOIL OVER THE THREE SEASONS.

It remains for us to summarise the results of three years' experiments in sandy soil, and to establish the average germination percentages for the several depths. This has been done in Table IV. below :—

TABLE IV.—*Showing Summary of Germination of Wheat at Various Depths in Sandy Soil, 1906, 1908, and 1909, together with Average Germination Percentages.*

Depth of Seeding.	Numbers Germinated.				Average Germination Percentages.
	Out of 10. 1906.	Out of 50. 1908.	Out of 50. 1909.	Out of 110. Total.	
$\frac{1}{2}$ in.	8	49	43	100	91
1in.	9	46	45	100	91
$1\frac{1}{2}$ in.	7	47	42	96	87
2in.	6	47	40	93	85
$2\frac{1}{2}$ in.	6	49	39	94	85
3in.	10	47	30	87	79
$3\frac{1}{2}$ in.	9	42	26	77	70
4in.	6	44	30	80	73
$4\frac{1}{2}$ in.	8	43	25	76	69
5in.	8	37	21	66	60
$5\frac{1}{2}$ in.	6	47	17	70	64
6in.	4	43	18	65	59

Again, if for the several depths tested we average the number of days over which germination extended during the three years we find that—

Seed placed $\frac{1}{2}$ in. deep showed above ground 8 to 15 days after seeding.

"	1in.	"	"	9 to 15	"	"
"	$1\frac{1}{2}$ in.	"	"	10 to 20	"	"
"	2in.	"	"	11 to 20	"	"
"	$2\frac{1}{2}$ in.	"	"	11 to 21	"	"
"	3in.	"	"	11 to 21	"	"
"	$3\frac{1}{2}$ in.	"	"	12 to 20	"	"
"	4in.	"	"	12 to 24	"	"
"	$4\frac{1}{2}$ in.	"	"	13 to 20	"	"
"	5in.	"	"	14 to 24	"	"
"	$5\frac{1}{2}$ in.	"	"	15 to 25	"	"
"	6in.	"	"	15 to 22	"	"

GENERAL CONCLUSIONS.

From the various data and tables given we may derive the following conclusions having reference to wheat sown in sandy soil in good seeding condition :—

1. That seed sown between $\frac{1}{2}$ in. and 1 in. deep germinates most freely.
2. That up to 4 in. of depth germination still proves fairly satisfactory, but beyond that depth it is generally very irregular.
3. That even at a depth of 6 in. more than 50 per cent. of the seed sown shows eventually above ground.
4. That shallow sowing leads, as a rule, to regular and rapid germination ; whereas deep sowing causes germination to extend irregularly over a long period of time, resulting, as a rule, in irregular patchy growth.
5. That in view of the fact that frequently a proportion of the seed sown at very shallow depths in sandy soils is apt to die off after germination if dry weather sets in, we are of opinion that for soils of this kind a depth of sowing of from 1 in. to 2 in. is to be recommended.

WHEAT IN HEAVY CLAY LOAM IN 1906.

As was the case with wheat sown in sandy soil, only 10 grains of wheat were placed at each depth in heavy clay loam in 1906. The seed was sown on June 6th. Germination results are shown below in Table V. :—

TABLE V.—*Showing Germination of Wheat Sown in Heavy Clay Loam at Various Depths in 1906.*

Depth of Seed- ing.	Germination Order and Numbers.																												Total Nos. Germi- nated.	
	June.																													July.
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2											
$\frac{1}{2}$ in.	1	1	1	2	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	8										
1 in.	—	2	—	2	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	7										
$1\frac{1}{2}$ in.	—	—	—	—	3	—	1	—	—	—	1	—	—	—	—	—	—	—	—	5										
2 in.	—	—	1	4	1	1	—	1	—	—	—	—	—	—	—	—	—	—	—	8										
$2\frac{1}{2}$ in.	—	—	—	2	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9										
3 in.	—	—	—	2	3	—	1	—	—	—	—	—	—	—	—	—	—	—	—	6										
$3\frac{1}{2}$ in.	—	—	—	1	2	—	—	1	1	1	—	—	—	—	—	—	—	—	—	6										
4 in.	—	—	—	—	1	—	—	1	1	—	—	—	—	—	—	—	—	—	—	3										
$4\frac{1}{2}$ in.	—	—	—	—	1	—	—	—	1	—	—	1	—	—	—	1	—	—	—	4										
5 in.	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1	—	1	—	—	3										
$5\frac{1}{2}$ in.	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	1	—	—	3										
6 in.	—	—	—	—	—	—	1	—	1	—	—	—	2	—	—	—	—	—	—	4										

On August 29th plants from seed sown $\frac{1}{2}$ in. deep showed to best advantage. Those from seed sown 1 in. to 3 in. in depth were approximately equal ; whilst below 3 in. the greater the depth the poorer the plants.

On October 12th plants from seed sown between $\frac{1}{2}$ in. and $2\frac{1}{2}$ in. inclusively were in full ear, whereas those from seeds placed at greater depths were only just coming into ear.

Birds unfortunately destroyed the greater portion of the grain before it had time to ripen off.

WHEAT IN HEAVY CLAY LOAM IN 1908.

Fifty grains of wheat were sown at the various depths on June 10th. Germination results are shown below in Table VI. :—

TABLE VI.—*Showing Germination of Wheat Sown in Heavy Clay Loam at Various Depths in 1908.*

Depth of Seeding.	Germination Order and Numbers.										
	June.										
	20	21	22	23	24	25	26	27	28	29	30
$\frac{1}{2}$ in.	21	18	3	—	—	1	—	1	—	—	—
1in.	6	35	5	—	—	1	—	—	—	—	—
$1\frac{1}{2}$ in.	—	11	19	5	—	4	2	1	—	—	1
2in.	—	4	12	4	9	3	1	—	—	1	—
$2\frac{1}{2}$ in.	—	—	1	3	6	16	10	—	—	—	—
3in.	—	—	—	—	5	7	12	12	1	—	—
$3\frac{1}{2}$ in.	—	—	—	—	—	4	14	—	2	—	1
4in.	—	—	—	—	—	—	5	5	5	2	2
$4\frac{1}{2}$ in.	—	—	—	—	—	—	—	8	5	2	2
5in.	—	—	—	—	—	—	—	—	3	4	4
$5\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	1	2
6in.	—	—	—	—	—	—	—	—	—	1	5

Depth of Seeding.	Germination Order and Numbers.												Total Nos. Germinated.
	July.												
	1	2	3	4	5	6	7	8	9	10	11	12	
$\frac{1}{2}$ in.	—	—	—	1	—	—	—	—	—	—	—	—	45
1in.	—	—	—	—	—	—	—	—	—	—	—	—	47
$1\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	43
2in.	1	—	—	1	—	—	—	—	—	—	—	—	36
$2\frac{1}{2}$ in.	—	1	—	1	—	—	—	—	—	—	—	—	38
3in.	1	—	1	—	—	—	1	—	—	—	1	1	32
$3\frac{1}{2}$ in.	1	1	—	—	—	—	1	—	—	—	—	—	24
4in.	4	1	—	—	—	—	—	—	—	—	—	—	24
$4\frac{1}{2}$ in.	1	5	3	—	—	—	1	1	—	—	—	—	28
5in.	5	3	2	2	—	—	—	—	—	—	—	—	23
$5\frac{1}{2}$ in.	6	5	4	1	—	1	—	1	—	—	—	—	21
6in.	7	9	2	1	—	—	—	—	—	—	—	—	25

Plants from seed sown $\frac{1}{2}$ in. to $2\frac{1}{2}$ in. deep came into full bloom on November 3rd; plants from seed sown 3in. to 4in. deep on November 5th; and plants from seed sown $4\frac{1}{2}$ in. to 6in. deep on November 12th. In heavy soils, therefore, the influence of late germination made itself felt in the after development of the plants.

All plants of this series matured safely. They were carefully harvested and weighed. Results secured are shown further on in Table IX., together with those collected in 1909.

WHEAT IN HEAVY CLAY LOAM IN 1909.

Fifty grains of wheat were sown at the various depths on May 24th. Germination results are shown below in Table VII. :—

TABLE VII.—*Showing Germination of Wheat Sown in Heavy Clay Loam at Various Depths in 1909.*

Depth of Seeding.	Germination Order and Numbers.																	
	June.																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
$\frac{1}{2}$ in.....	6	6	3	6	3	5	—	1	2	1	5	1	1	3	—	—	—	1
1 in.....	5	7	9	8	5	—	3	3	2	—	—	2	1	—	1	—	—	—
1½ in.....	1	4	10	12	11	1	1	—	1	—	—	—	1	2	—	—	—	—
2 in.....	—	3	5	9	8	2	4	5	2	1	1	—	—	1	—	—	1	—
2½ in.....	—	—	—	3	6	8	5	4	3	4	1	3	2	—	1	—	—	1
3 in.....	—	—	—	1	6	3	5	3	—	7	2	2	2	—	2	1	1	3
3½ in.....	—	—	—	—	2	1	4	8	—	3	4	3	2	3	1	4	3	—
4 in.....	—	—	—	—	—	5	2	6	—	1	1	1	5	4	3	2	1	2
4½ in.....	—	—	—	—	—	—	5	2	4	3	2	—	6	2	1	2	3	1
5 in.....	—	—	—	—	—	—	5	3	—	2	1	8	—	2	—	3	—	—
5½ in.....	—	—	—	—	—	—	2	—	—	2	1	2	4	2	2	—	3	4
6 in.....	—	—	—	—	—	—	—	—	1	2	3	2	2	1	1	2	2	2

Depth of Seeding.	Germination Order and Numbers.																												Total Numbers Germinated.	
	June.														July.															
	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3															
$\frac{1}{2}$ in.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	44
1 in.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	46
1½ in.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	44
2 in.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	42
2½ in.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	41
3 in.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	38
3½ in.....	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	39
4 in.....	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	34
4½ in.....	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	32
5 in.....	—	—	—	—	3	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	28
5½ in.....	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24
6 in.....	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	21

As was the case in the preceding year, we were able to harvest all plants of this series. Results secured are indicated further on in Table IX., together with those of 1908.

SUMMARY OF THE GERMINATION OF WHEAT IN HEAVY CLAY LOAM OVER THE THREE SEASONS.

We have now to summarise the results of the three years' experiments in heavy clay loam, as has already been done for sandy soil. These results are summarised below in Table VIII. :—

TABLE VIII.—*Showing Summary of Germination of Wheat at various depths in Heavy Clay Loam, 1906, 1908, and 1909, together with Average Germination Percentages.*

Depth of Seeding.	Numbers Germinated.				Average Germination Percentages.
	Out of 10. 1906.	Out of 50. 1908.	Out of 50. 1909.	Out of 110. Total.	
$\frac{1}{2}$ in.	8	45	44	97	88
1in.	7	47	46	100	91
$1\frac{1}{2}$ in.	5	43	44	92	84
2in.	8	36	42	86	78
$2\frac{1}{2}$ in.	9	38	41	88	80
3in.	6	32	38	76	69
$3\frac{1}{2}$ in.	6	24	39	69	63
4in.	3	24	34	61	55
$4\frac{1}{2}$ in.	4	28	32	64	58
5in.	3	23	28	54	49
$5\frac{1}{2}$ in.	3	21	24	48	44
6in.	4	25	21	50	45

If now for the various depths tested we average the number of days over which germination extended during the three years covered by the experiments, we find that—

Seed placed	$\frac{1}{2}$ in. deep	showed above ground	9 to 21 days after.
"	1in. "	"	9 to 17 "
"	$1\frac{1}{2}$ in. "	"	10 to 20 "
"	2in. "	"	10 to 21 "
"	$2\frac{1}{2}$ in. "	"	11 to 20 "
"	3in. "	"	12 to 24 "
"	$3\frac{1}{2}$ in. "	"	13 to 26 "
"	4in. "	"	14 to 24 "
"	$4\frac{1}{2}$ in. "	"	14 to 26 "
"	5in. "	"	15 to 30 "
"	$5\frac{1}{2}$ in. "	"	16 to 27 "
"	6in. "	"	16 to 24 "

Before indicating what we take to be the conclusions to be derived from this series of experiments, we shall summarise, in Table IX., harvest results secured in 1908 and 1909.

TABLE IX.—*Showing Grain and Total Produce collected in 1908 and 1909 from Grain Sown at Various Depths.*

Depth of Seeding.	Out of 50 Seeds Sown.				Total Matured in two Years.	Grain.		Total Produce.	
	1908.		1909.			Total.	Per Plant.	Total.	Per Plant.
	Germinated.	Matured.	Germinated.	Matured.					
$\frac{1}{2}$ in.	45	43	44	41	84	31	0.37	76	0.90
1in.	47	46	46	34	80	37 $\frac{1}{2}$	0.47	76	0.95
1 $\frac{1}{2}$ in.	43	37	44	32	69	28 $\frac{1}{2}$	0.41	56	0.81
2in.	36	28	42	26	54	19 $\frac{1}{2}$	0.36	48	0.89
2 $\frac{1}{2}$ in.	38	32	41	32	64	27 $\frac{1}{2}$	0.43	72	1.12
3in.	32	25	38	26	51	19 $\frac{1}{2}$	0.38	52	1.02
3 $\frac{1}{2}$ in.	24	16	39	31	47	26	0.55	68	1.45
4in.	24	15	34	29	44	25 $\frac{1}{2}$	0.59	64	1.45
4 $\frac{1}{2}$ in.	28	17	32	32	49	31	0.63	80	1.63
5in.	23	15	28	24	39	26 $\frac{1}{2}$	0.69	64	1.64
5 $\frac{1}{2}$ in.	21	12	24	23	35	18	0.51	56	1.60
6in.	26	15	21	15	30	?	?	36	1.20

With reference to Table IX., it will be noted that whilst on the whole the total yields were heavier in the case of grain sown at the shallower depths, the yields of individual plants, both as to grain and total produce, were generally heavier where the seed had been placed at greater depths. This, we believe, may be accounted for on the ground that where seed had been sown deeply only a small number of plants were left to mature; and these were able, in consequence, to acquire greater individual development. In ordinary practice this would not be the case, as rank weed growth would soon have the better of a field in which germination had been scanty and patchy.

GENERAL CONCLUSIONS.

The following conclusions, having reference to wheat sown at various depths in heavy clay loam, may be derived from the various tables and data already given:—

1. That seed placed 1in. deep gives the best percentage of successful germination.
2. That germination continues to be fairly satisfactory down to a depth of 2 $\frac{1}{2}$ in.
3. That when seed is placed below 4 $\frac{1}{2}$ in. more than 50 per cent. of it is lost.
4. That whilst at a depth of 1in. germination in heavy clay loam is quite as good as in light sandy soil, it is always less satisfactory at greater depths.
5. That germination is perceptibly slower and more irregular in heavy clay loam than in light sandy soil.
6. That for ordinary purposes a depth of 1in. may be recommended for seeding of wheat in heavy clay loam, and that on no account should 2 $\frac{1}{2}$ in. be exceeded in soil of this character.

(To be continued.)

THE DAIRY.

REARING OF YOUNG DAIRY STOCK.

By P. H. SUTER, Dairy Expert.

The most important essential to attain success in dairying practice may fairly be said to be the fitness of the farmer to breed good, profitable dairy stock, such as possess evidence of intelligent breeding, and high dairy development.

If those who keep cows would put more sound thought and dairy sense into the business, in the direction of breeding and feeding, it would, during the coming years, prove the most sound, safe, and profitable branch of farming. Such it is to-day where the right man with the right ideas has hold of the business.

I am of opinion that few herds are conducted on a clean and economic basis. Too many of the cows are not capable of fulfilling the purpose for which they are kept, viz., for heavy milk and butter production. On the contrary, they are proving simply a drain upon the farm.

Why is this so? First, because many have never had proper conditions allowed them, being injudiciously fed, as calves, or later when they are being milked at the bails. Second, they are not bred on the right lines to produce milk, being in most instances the progeny of bulls not capable of transmitting good dairy qualities.

THE FEEDING.

I herein purpose dealing more particularly with the question of the feeding of the young dairy stock from calfhood.

It is a lamentable fact that the greater percentage of our young stock seen upon the farms, show evidence of breeding and feeding upon lines of chance, and are so uncared for as to seriously check the development of the highest dairy functions.

The dairyman should endeavor to learn all he can of the art of successfully rearing his heifer calves. Having, I take it, been very careful to select the services of a bull coming of ancestors holding a long line of deep milking merit, he must then give full consideration as to how to rear the calves, so as to assist him to secure dairy development; at all times keeping them healthy, vigorous, and growing.

A dairyman cannot give his attention to anything which will prove more profitable. The early care of the young calf has a marked effect on the future ability as a cow. The first 12 months of the young calf's life are, I feel sure, the most important, and therefore every effort should be made to so raise them as to put them in the full developing way towards motherhood. A satisfactory development of the organism at maturity is only assured when the early growth is liberal and even. This calls for the supplying of nutritious, developing food, containing just what is necessary to produce bone, nerve, tissue, muscle, flesh, &c.

The man who desires to secure the best dairy development in his cows must be a liberal and judicious feeder. A stingy and careless feeder can easily be picked out by the condition of his calves at the farm. The neglect in this particular is responsible for so many cows possessing poor development from a dairy point of view, and results in a greater susceptibility to many constitutional defects.

Amongst some of our farmers it is found to be a common practice not to remove the calf from the cow until three days after its birth. This practice may be justified in the case of a calf which, it is considered, is somewhat of weak appearance, and requires a little extra maternal attention to give it a good start; but for all general purposes it is not an advisable method, as better results will follow the removal of the calf from the mother within the first 24 hours after its birth.

If the former method is adopted, viz., leaving it run with its mother four days, until the milk secretion assumes practically a normal condition, the feeder will experience more difficulty in teaching the young calf to feed, and the mother will certainly fret more, which may cause her to form a habit of holding her milk, and increase the possibilities of inflammatory troubles in the udder, such as garget, &c. It may also happen that the milk may prove too rich for the young calf, and this may cause diatetic troubles.

Better results are obtained by removing the calf as soon as it has been cleaned down by the cow; the cow will not fret so much, and the young calf is much more easily induced to drink.

Possibly the teaching of the young calf and the breaking in of the heifer later are the two items most dreaded in the ordinary routine of dairy work. However, they are easily overcome when the attendant will exercise a little patience. Very little trouble should be experienced in inducing the young calf to drink. Should it show little inclination to drink, then gently lower its head to the bucket, and with the hand put a little milk in its mouth and immediately insert a finger, when it will generally suck. Should it remain stubborn and refuse to exhibit any desire to drink, it is useless to persist in the attempt. Do not be cruel to the calf by hitting and kicking it, as I have seen many do. Quietly put it aside in a nice warm sheltered place,

and, in the course of six or seven hours' time, the calf will have almost surely become hungry. It will then be found to drink readily.

Feeding of the young calf should be done regularly. Feed it three times daily, with its mother's milk for the first week. This is an important matter, for the mother's milk during this period is of a very different composition to what it is after seven days from calving.

The milk taken from the cow during the first week is known as beestings, or colostrum. It contains a very different percentage of solids, such as albumen, sugar, fat, &c., than that taken from the cow a week later. The difference is shown as follows :—

Composition of Beestings, or Colostrum.

Water	75.0
Casein	4.0
Albumen.....	13.5
Fat	3.0
Milk Sugar	2.9
Ash	1.6
	<hr/>
	100

Composition of Normal Milk Seven to Ten Days after Calving.

Water	87.0
Fat	3.8
Casein	3.8
Albumen	
Milk Sugar	4.7
Ash	0.7
	<hr/>
	100.0

Attention is directed to the great difference in the percentages of casein and albumen, sugar, fat, &c., as shown above.

Nature has, in order to assist to build up the structure of the calf and give it a good start off in life, supplied the necessary nutrients in the best form and proportions, the colostrum, or beestings, acting as a tonic.

Care should be taken not to over-feed the calf, and to see that the milk fed at all times is at a temperature of from 96° to 98° F. This is most important, as is also the point that the utensils from which the milk is fed should be kept scrupulously clean. Negligence in these matters often upsets the young calf's digestive system, and this at times causes death.

The young calf should receive whole, not separated, milk for the second and third weeks of its life, at the end of which time the feeder may gradually substitute skim milk or separated milk. This change, however, should be

effected very gradually, probably not less than two weeks being taken to reduce the ration from whole to separated milk.

I should recommend adding some suitable kind of concentrated food containing digestible fat at the end of the third week's feeding. This is to take the place of the fat removed from the skimmed or separated milk, and in this respect I can recommend nothing better than boiled ground linseed, pollard, and a little molasses. These, if well boiled up and then added to the milk and fed at a temperature of from 96° to 98°, force the calves along well, as also will any of the special calf foods on the market. A little cod liver oil, say a tablespoonful fed twice daily, is also followed with good result; but this must be fed very gradually, as the odor, if too much is fed at first, prevents the calf from drinking.

In feeding, never make any sudden changes; gradually increase the amount as the calf grows older. I recommend feeding three times daily for the first ten days, and after that period twice daily until the calf is five months old, when, if all has gone well, it will have made good headway towards good dairy form. During this period the calf should also receive a little fine oaten or lucerne hay, a little crushed oats or bran, and have the run of a small, clean, grassed paddock.

At five to six months old the calf should be fit to wean; if not, continue to give one feed daily until it is considered forward enough for weaning. I should strongly recommend the adding of a pinch of salt daily to each calf's milk. This will make it more palatable, and will have a beneficial medicinal effect. Further, the addition of a cupful of limewater, added to the food say twice weekly, will greatly assist the young calf to ward off scouring. Every effort should be made to prevent the calf's digestive system being upset, for when this occurs it means a severe check to its development.

Feeders should be careful not to make the following mistakes, viz.:—Over-feeding; feeding from dirty utensils; feeding milk below a temperature of 95° or above a temperature of 98°; and making sudden changes in the rations.

Never over-feed; always try at first to leave the calf anxious for a little more. If the calf is overfed to dulness it results in indigestion, and this leads to scouring, which may end fatally.

No rule can be laid down as to the quantity of food to give to calves, as they differ so much in size and requirements, but it should be remembered that nothing upsets a young calf's system sooner than the making of any of the above errors.

In winter see to it that your calves have a clean, warm pen, wherein clean straw is daily laid down. Failing that, calves are apt to get white scours; and as a preventive of this I recommend that the navel cord should be tied with a piece of disinfected silk or string. Tie the navel cord 2in. from the

belly, then cut the navel cord off half an inch below the knot and smear the navel with Stockholm tar.

The three methods of feeding calves generally adopted are by the indiarubber teat, the trough, and the bucket. Of the three I prefer the rubber teats, for they are the more natural. When they are used a calf will not bolt its food, but will take it gradually, and will do unquestionably better. This method also induces a better secretion and the mixing of the saliva before swallowing, with the result that there is better digestion of the food consumed.

The method of feeding by the rubber teats has, however, a disadvantage from a bacteriological standpoint, because if the teats are not kept scrupulously clean it is sure to create scouring.

THE TREATMENT OF HEIFERS.

After weaning young heifers—that is, when milk ceases to be fed to them, and they are well grown, being fit to turn out into paddocks—they should receive good, rich pasture to ensure further nourishment and growth, there being nothing better for this purpose than good grasses and clover. Where this cannot be obtained a little hand feeding of crushed oats and chaff, or lucerne or oaten hay should be supplied, at the same time giving plenty of coarse, bulky foods such as hay, grasses, &c., to accustom the heifer to work up and digest large quantities of food.

The heifers may develop large bellies, but that is of no consequence so long as they develop right and show good development in well-sprung ribs, deep body, flank, &c., without any tendency to coarseness or beef production. A deep, large, capacious body is desirable, as it indicates a capacity for treating large quantities of food which, if the animal be a dairy beast, will be converted into milk, whilst, on the other hand, if she is not a true dairy beast, such food will go to the production of beef.

The dairyman's heifers should never receive a check in their growth. He should see to it that they are always in a sound, healthy growing condition, yet never too fat.

At 18 to 20 months, providing the heifer is well grown, she should be mated with a good bull.

In conclusion, I would impress upon those who read this article to feed their calves liberally and judiciously, which practice, I feel sure, will lead to a superior type of cow possessing a better constitution. I feel that the cause of our dairy people losing so many of their cows from that disease commonly called dry bible and from impaction and paralysis is due in no small measure to the absence of sufficient nutrition being supplied during calthood. The result is that they are more susceptible to disease, especially in later years, when the great strain of milk production is upon their system, and at which time thousands of cows and heifers do not receive a food supply suitable to satisfying their full wants.

GOVERNMENT EXHIBITS AT THE ADELAIDE SHOW.

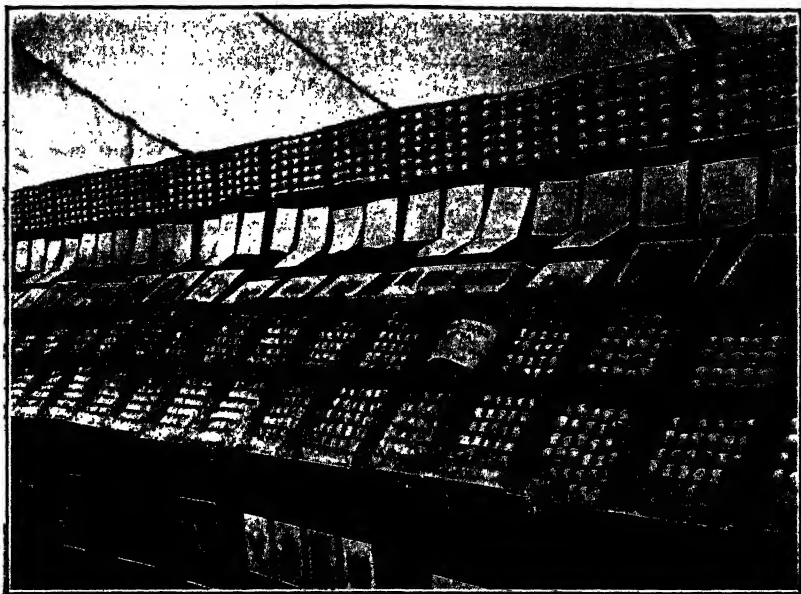
LIVE STOCK PRIZES GAINED BY ROSEWORTHY COLLEGE.

One of the most interesting sections of the Show of the Royal Agricultural and Horticultural Society, held last month, was the exhibits prepared by different Government departments. In a large marquee situated in a con-



Seed Wheat Exhibit.

venient position on the continental ground the officers of the Agricultural and Produce Department showed an attractive and instructive series of exhibits. These consisted of a wheat section under the charge of the departmental miller (Mr. Stevens); canned meats, butter, honey, preserved fruits,



Portion of Poultry Section.



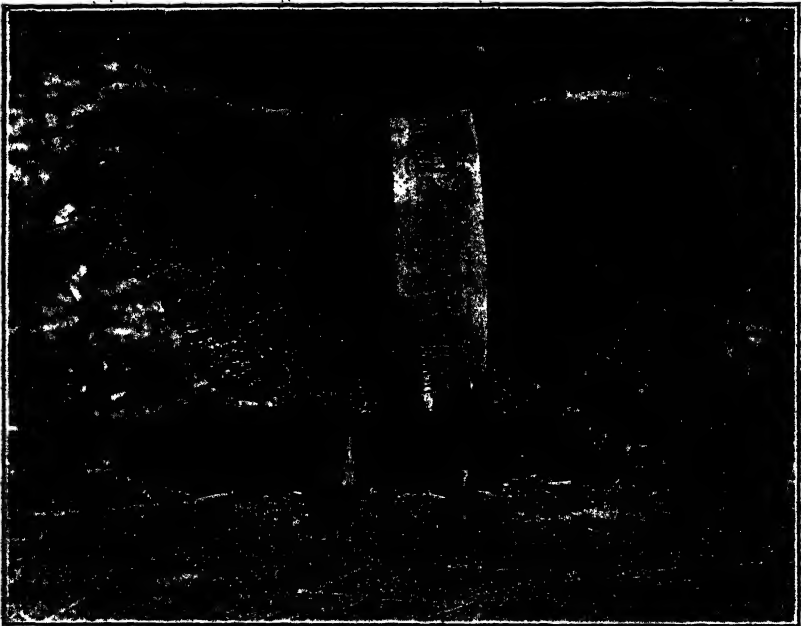
Canned Meats and Manures.

poultry meal, and fertilisers in charge of the Produce Department salesman (Mr. Nash); a poultry section under the Poultry Expert (Mr. Laurie); a collection of citrus fruits tabled by the Horticultural Instructor (Mr. Quinn); and about 20 fleeces of wool of different types exhibited by the Wool Expert. A model poultry-house, constructed entirely of iron, to hold about 20 fowls, which was exhibited by the Poultry Expert, came in for a great deal of attention.

Officers were in attendance at the various sections for the purpose of giving information to inquiries, and the marquee was thronged with interested visitors throughout the greater portion of the four days of the Show. In addition, the Immigration Department had an officer in attendance to answer inquiries concerning assisted immigration of farm laborers.

In the competitive sections the Agricultural College, as usual, showed a number of sheep and pigs, with gratifying success.

Roseworthy Agricultural College.



Champion Southdown Ram, Adelaide, September, 1911.

In Southdown sheep the College had 12 exhibits (the maximum number allowed to a single exhibitor), all of which were prize winners, with the exception of an imported ewe purchased last year by Professor Perkins. This

ewe had been shorn last January in quarantine, and did not in consequence catch the judge's eye. In rams the College took champion prize with a ram of their own breeding, sired by a ram sent over by Professor Lowrie. The champion ram was also placed first in the aged ram class. The second prize in this class went to a College-bred ram, sired by the New Zealand ram. The third prize in the aged class went to Luton Hoo, purchased last year by Professor Perkins. This imported ram also labored under the disadvantage of having been shorn in quarantine in January last. In young rams under 1½ years, the College carried off first, second, and fourth prizes with rams of their own breeding. All three had been sired by the New Zealand ram.

In Southdown ewes the College took champion ewe with a ewe of their own breeding. In the aged class they were also awarded first and second prizes, the prizetakers being full sisters. The second prize ewe had been placed as champion in 1910. In ewes under 1½ years the College were awarded first, second, and third prizes with ewes of their own breeding; all three were by the New Zealand ram.

Roseworthy Agricultural College.



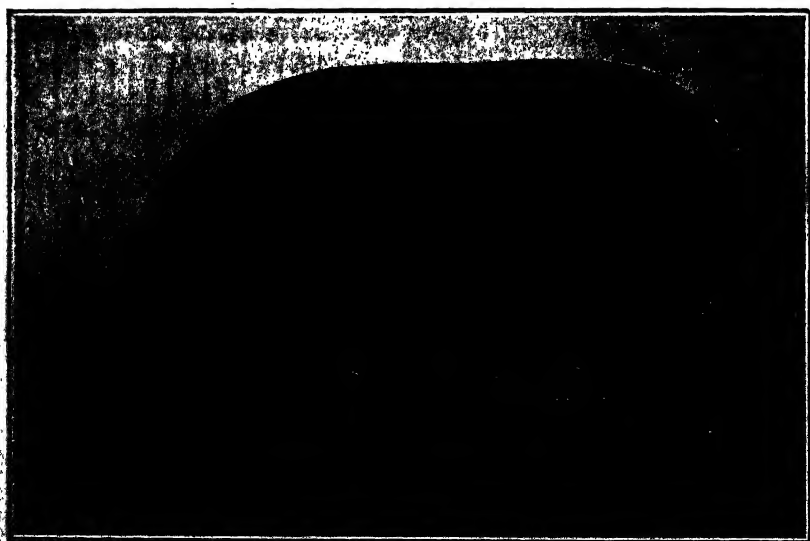
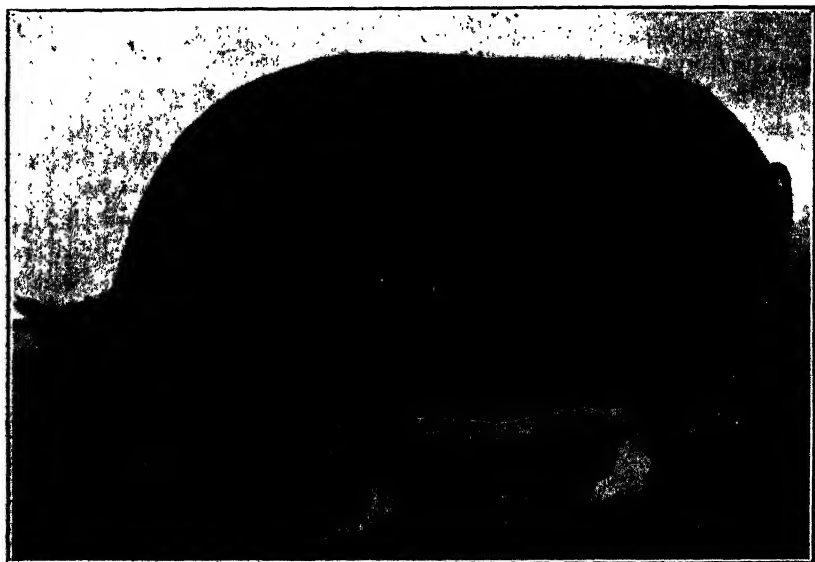
Champion Southdown Ewe, Adelaide, September, 1911.

In pigs, champion prize for sow of any breed was awarded to the College for a Berkshire sow of their own breeding. The same sow was awarded first prize as a Berkshire sow, the second prize going to a sow imported last year from England. The latter, however, was at a disadvantage in that she had

only just been weaned off a litter. The College was also awarded second prize for a young Berkshire boar, which realised subsequently £5 5s. at auction.

In export lambs the College took second prize with a pen of 10 crossbred

Roseworthy Agricultural College.



Prize Berkshire Pigs.

lambs by Southdown rams out of Merino x Dorset Horn ewes. These lambs realised 15s. 6d. at auction. The College was awarded third prize in the same class for a pen of 10 crossbred lambs by Southdown rams out of Merino x Shropshire ewes, which at auction realised 14s. 9d. The College took second prize in export lambs (Professor Lowrie's prize), with a pen of 10 lambs by Southdown rams out of Merino x Dorset Horn ewes; these secured 17s. 3d. at auction. Finally, the college were awarded third prize for a pen of five Merino lambs.

CODLIN MOTH CONTROL.

FURTHER TESTS WITH LEAD ARSENATES.

By GEO. QUINN, Horticultural Instructor.

By the courteous permission of Mr. Hugh Kennedy, further tests of the comparative values of several brands of arsenate of lead, for preventing injury by codlin moth, were carried out by Inspector Wishart, in his orchard near Lyndoch, during the season 1910-11.

As remarked in a report upon the tests of the previous year, this small orchard is located about a quarter of a mile distant from any other garden, and is situated on a flat adjoining a permanent running creek about a mile from the township of Lyndoch. The soil is a stiff dark clay loam, and the planted block forms a rectangle with the longer rows of trees running roughly east and west. Being planted in squares the cross lines are pointing approximately north and south.

As the attached sketch plan indicates, eight rows containing 103 apple and one Williams' Bon Chretien pear trees were selected. Besides these a few quince, lemon, orange, peach and apricot trees were set in the rows. The ninth row contained one apple tree, and this was counted into the eighth row of this test. Prior to the spraying conducted during the previous season the trees had been allowed to grow very dense, and some thinning was then performed upon the tops.

Before this test a further amount of wood was removed from the heads, but the pruning consisted of taking out a few branches and laterals, and not cutting back leaders. This treatment was not calculated to stimulate the production of wood, but merely to admit sufficient light throughout the tops of the trees.

The orchard carried a good crop the previous season, but during the period covered by this present test only a fair crop was borne by the Rome Beauty variety, a lesser yield by the Cleopatra, and a very inferior one by the Dunn's Seedling.

EAST—DISTRICT ROAD.

NORTH—WIRE FENCE.

Row 1.	Row 2.	Row 3.	Row 4.	Row 5.	Row 6.	Row 7.	Row 8.	Row 9.
Cleo.	Cleo.	Cleo.	Cleo.	Lord Nelson.	Cleo.	Cleo.	Cleo.	Dunn's S.
Cleo.	Cleo.	Cleo.	Cleo.	Cleo.	Cleo.	Apricot.	Cleo.	—
Cleo.	Cleo.	Cleo.	Cleo.	Cleo.	Cleo.	Cleo.	Cleo.	—
Cleo.	Peach.	Orange.	Orange.	Cleo.	Orange.	Quince.	Quince.	—
W.B.C. Pear.	Apple.	Quince.	Lemon.	Lemon.	Lemon.	Quince.	Quince.	—
—	—	Lemon.	Lemon.	Lemon.	Lemon.	Dunn's S.	Apricot.	—
Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	—
Lord Nelson.	Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	—
Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	Dunn's S.	—
Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	—
Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	—
Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	—
Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Lord Nelson.	Rome B.	—
Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	—
Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	Rome B.	—
Rome B.	—	Lord Nelson.	Rome B.	Rome B.	—	—	—	—

Row 1 sprayed 4 times.

" 2 sprayed 4 times.

" 3 sprayed 4 times.

" 4 unsprayed, but the tree stems bandaged.

" 5 untreated.

" 6 sprayed 3 times with Bickford's "Our Jack" lead arsenate.

" 7 sprayed 3 times with Vreeland's "Electro" lead arsenate.

" 8 and 9 sprayed 3 times with Jenkins' "Austral" lead arsenate.

As the fruit on the apple and pear trees in this orchard had been subject to injuries from black spot fungi (*Fusicladiums*), rows 1, 3, and 7 were sprayed with Bickford's "Our Jack" Bordeaux paste, and rows 2, 6, and 8 with Bordeaux mixture made on the formula, 6lbs. copper sulphate, 4lbs. quick-lime, 45galls. of water, just as the buds began to unfold. This operation was performed on the Cleopatra and Dunn's Seedling trees on September 26th, and on those of the Rome Beauty on October 19th. In both cases the buds were just opening.

The applications of the lead arsenates to the different varieties of apples were made as follows :—Cleopatra, October 22nd, November 14th, and December 29th ; Dunn's Seedling, October 22nd, November 23rd, December 29th ; Rome Beauty, November 8th and 23rd, and December 30th ; Lord Nelson, October 22nd and November 14th. When spraying Cleopatras and Lord Nelsons on November 14th the three trees of the former variety growing in row 6 were left unsprayed. To test the protective value of a late spraying, rows 1, 2, and 3 were sprayed throughout on February 8th, 1911.

When the fruits were harvested the Cleopatras in row 1 had 98·52 per cent. free from codlin injury, whilst those sprayed with the same compound in row 6 possessed a percentage of 95·87 unburrowed by that insect. It would appear from this that the difference may be due to either the omission of the second spraying on November 14th, or to the application of the fourth spraying which row 1 received as late as February 8th. In respect to this late spraying the Cleopatras in rows 2 and 3 which received it yielded 98·65 per cent. and 97·63 per cent. sound respectively, as against 97·97 per cent. and 96·20 per cent. in rows 7 and 8 which did not get it.

As in the previous year's work the longer rows running east and west were selected, affording, as the following table shows, a fairly even number of trees of the principal varieties, viz., Cleopatras, Dunn's Seedling, and Rome Beauty in every row :—

Row 1 contained 7 Rome Beauty, 2 Dunn's Seedling, 4 Cleopatra.

" 2	" 6	" 3	" 3	"
" 3	" 6	" 3	" 3	"
" 4	" 7	" 3	" 3	"
" 5	" 7	" 3	" 3	"
" 6	" 6	" 3	" 3	"
" 7	" 5	" 4	" 2	"
" 8	" 6	" 4	" 3	"

A tree of Lord Nelson is present in each of rows 1, 3, 5, and 7, whilst row 1 had a Bon Chretien pear also, and row 2 possessed an unknown apple tree. The quince trees indicated in the sketch plan were sprayed, but no account taken of their fruits, which were not badly affected by the codlin moth.

It will thus be seen by reference to the sketch plan that rows 1 and 6, sprayed with Bickford's "Our Jack" arsenate, contained 27 trees; rows 2 and 7, treated with Vreeland's "Electro" arsenate, held 26; and rows 3, 8, and 9, which were sprayed with Jenkins' "Austral" arsenate, contained 28; row 4, left unsprayed but bandaged, 13; and row 5, which received no treatment, carried 14 trees.

The chemical constituents of these arsenates as determined by Mr. W. A. Hargreaves, M.A. (Government Analyst), were as follows:—

Maker and Brand.	Moisture.	Lead, Calculated as Pb.O.	Total Arsenic, Calculated as As ₂ O ₅ .	Arsenic, Soluble in Water, Calcu- lated as As ₂ O ₅ .
Vreeland's "Electro"	38.25	41.14	20.04	0.094
Jenkins' "Austral"	34.29	44.96	14.64	0.604
Bickford's "Our Jack" ...	63.51	24.51	11.79	0.104

In the application of these arsenates in every case the paste was used at the rate of 1lb. in 20galls. of water; the procedure being to liquefy the poison into the consistency of a thin cream before stirring it into the water which filled the tank of the spray pump.

In addition to the spraying, all of the trees in the rows excepting in No. 5, were bandaged in the usual manner to entrap the caterpillars. In the case of row 5, no precaution of any kind was taken against the codlin moth beyond that the fallen fruits were collected and examined at intervals of from seven to 10 days. This procedure was also followed in respect to the windfalls throughout all sections of the test. The whole of the bandages were examined carefully at similar intervals, and a careful record taken of the caterpillars caught in each row. These operations were begun on December 8th, 1910, and continued until April 20th, 1911, before which date the harvesting had been completed.

In connection with the early examinations, row 5, which received no remedial attention, disclosed 17 windfalls burrowed by codlin larvæ at the first collecting on December 8th, against 4 injured fruits from all of the treated rows. On December 17th this row yielded 15 infested fallen fruits as compared with 13 from the others. On December 17th row 5 yielded 46 as against a combined total of 37 from the remainder of the whole block. The examination made of windfalls on January 5th gave 39 infested to row 5, and 29 from the combined treated sections. Of these 16 were found in row 4, which was unsprayed but bandaged only. At the examination of January 12th

the bandaged row 4 disclosed 35 burrowed fruits, the untreated row 5 had 50 infested windfalls, and all the sprayed rows 22 moth injured fruits between them. Till the end of the harvesting period this comparison between rows 4, 5, and the sprayed sections combined is summarised below :—

MOTH INJURED WINDFALLS.

Date of Collection.	Row 4, Bandaged only.	Row 5, No Remedy.	All Sprayed Rows Combined.
January 19th	32	50	33
" 26th	57	104	16
February 3rd	95	127	22
" 10th	59	76	24
" 17th	58	46	29
" 24th	99	69	23
March 3rd	128	95	26
" 10th	171	161	63
" 16th	143	150	108
" 23rd	136	128	51
" 30th	90	90	73
April 6th	64	58	69
" 13th	53	52	25
" 20th	18	20	13

The following table shows the number of caterpillars taken from the bandages in each row at each examination ;—

Date of Examination of Bandages.	Row 1.	Row 2.	Row 3.	Row 4.	Row 5.	Row 6.	Row 7.	Rows 8-9.
December 8th	—	—	—	—	No bandages used.	—	—	—
" 17th	1	—	—	10		1	—	—
" 27th	3	—	3	13		1	1	—
January 5th	1	1	—	21		1	—	—
" 12th	7	—	1	46		—	1	1
" 19th	10	12	2	31		1	—	2
" 26th	3	—	2	61		1	1	2
February 3rd	6	1	11	67		9	3	2
" 10th	3	—	6	38		2	1	3
" 17th	4	—	2	41		2	3	3
" 24th	12	3	10	62		11	6	6
March 3rd	4	—	8	68		11	3	13
" 10th	14	1	5	67		21	4	16
" 16th	5	1	—	32		8	6	7
" 23rd	8	—	2	48		12	6	2
" 30th	3	—	3	15		9	1	5
April 6th	7	—	5	13		6	3	6
" 13th	3	—	1	7		1	1	4
" 20th	—	1	—	2		—	—	1
Total	94	20	61	642	—	96	40	73

A final examination of the bands during June yielded only two caterpillars, and those were in the unsprayed rows.

These figures are worthy of further analysis. Again, referring to the sketch plan, it will be found that the six rows sprayed with arsenates contained 81 trees, and in the bandages around these 374 caterpillars were taken, equaling 4.58 caterpillars to each tree. Of the two unsprayed rows (4 and 5) only the first-named was bandaged. These bands yielded 642 larvæ, or an average of 49.38 insects to each tree.

The following table gives the results of the examination of windfalls and bandages from each row and each section :—

Treatment.	Row.	Caterpillars.	Sound Fruit.	Moth-Injured Fruit.
Sprayed with "Our Jack" arsenate	1	94	1,616	165
" " " "	6	96	1,133	149
Sprayed with "Electro" arsenate	2	20	974	24
" " " "	7	40	749	97
Sprayed with "Austral" arsenate	3	61	1,060	90
" " " "	8 and 9	73	881	119
Bandaged only	4	642	971	1,279
No remedy	5	no record	1,041	1,393

When the harvesting time arrived the apples on the Cleopatra trees had reached a fairly large size, averaging 110 to the bushel case. Those on the Rome Beauty trees were good, but only medium in size, averaging 150 apples to the case. Of the former equal to 44½ bush. were picked, and the latter gave 89½ cases of a similar capacity. The Dunn's Seedling and Lord Nelson fruits were so few that Mr. Wishart counted them individually from each row. On the above figures the picked fruit from each row and section was as follows :—

Treatment.	Row.	Sound Fruit.	Moth-Injured Fruit.
Sprayed with "Our Jack" arsenate	1	4,365	72
" " " "	6	2,574	98
Sprayed with "Electro" arsenate	2	3,200	20
" " " "	7	2,252	78
Sprayed with "Austral" arsenate	3	2,390	42
" " " "	8 and 9	1,674	100
Bandaged only	4	1,667	263
No remedy	5	1,071	256

The sum of these two tables give the following final results for each row :—

Treatment.	Row.	Captured Caterpillars.	Sound Fruits.	Moth-Injured Fruits.	Total.	Percentage of Sound Fruit.
Sprayed 4 times with " Our Jack " arsenate	1	94	5,981	237	6,218	% 96.85
Sprayed 3 times with " Our Jack " arsenate	6	96	3,707	247	3,954	93.75
Sprayed 4 times with " Electro " arsenate ..	2	10	4,174	44	4,218	98.95
Sprayed 3 times with " Electro " arsenate ..	7	40	3,001	175	3,176	94.48
Sprayed 4 times with " Austral " arsenate ..	3	61	3,450	132	3,582	96.30
Sprayed 3 times with " Austral " arsenate ..	8 & 9	73	2,555	219	2,774	92.10
Bandaged only	4	642	2,638	1,542	4,180	63.11
No remedy	5	no record	2,112	1,649	3,761	56.15

Finalised these records show :—

Treatment.	Row.	Captured Caterpillars.	Sound Fruits.	Moth-Injured Fruits.	Percentage Sound.
Sprayed with " Our Jack " arsenate	{ 1 6 }	190	9,688	484	% 95.25
Sprayed with " Electro " arsenate	{ 2 7 }	50	7,175	219	97.04
Sprayed with " Austral " arsenate	{ 3 8-9 }	134	6,005	351	94.46
Bandaged only	4.	642	2,638	1,542	63.11
No remedy	5	no record	2,112	1,649	56.15

The results of spraying with all of these brands of lead arsenate may be considered highly satisfactory, and those from the use of Vreeland's " Electro " are not likely to be surpassed, giving it a lead of 42.13 per cent. more sound fruit than was obtained from the untreated row.

Omitting the moth-infected fruit collected and harvested from row 5, which was neither bandaged nor sprayed, the number of caterpillars taken from the remainder of the block totalled 1,016, and the number of tunnelled apples 3,502, which shows a great many of the caterpillars were either removed in the fallen fruits or escaped probably to other places of refuge. In any future tests an effort will be made to solve this question.

WHERE DO THE CODLIN MOTH CATERPILLARS ENTER THE APPLES ?

Although not strictly a phase of the test set out for him to accomplish, Mr. Wishart—who is also a commercial orchardist—went to very great labor in attempting to solve the above question.

With a view to obtaining some exact information respecting the precise position at which the codlin caterpillars most frequently entered the fruits, that officer carefully scrutinised and made separate records of all of the windfall apples and pears collected in each row from December 8th till February 24th. The following is a summary of these records :—

Date of Collection.	Entered on Side.	At Calyx End.	At Stem End.
December 8th	20	—	1
" 17th	21	4	3
" 27th	57	19	7
January 5th	47	14	7
" 12th	65	38	4
" 19th	70	35	10
" 26th	79	81	17
February 3rd	110	100	35
" 10th	92	46	19
" 17th	73	38	22
" 24th	106	54	31
Totals	740	429	156
Grouped together in monthly totals, the figures are—			
December	98	23	11
January	261	168	38
February	381	238	107

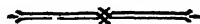
It is to be regretted that these observations were not recorded for the remainder of the season. They are not wholly in accord with the widely-accepted statement that the majority of the first brood caterpillars enter the young apples from the calyx or eye ends of the fruits. During December the proportion entering at the side was as 4.26 to 1, starting at the calyx, and 8.90 to 1 going in at the stem. In January this comparison of the side tunnelled to the calyx and stem entered fruits altered to 1.55 and 6.86 respectively. During February it stood at 1.60 and 3.56, indicating that whilst the proportion entering at the calyx was merely maintained, there was a decided rise in the numbers entering from the stem end as the fruits became pendulous and approached a full-grown size.

BORDEAUX MIXTURE *Versus* BORDEAUX PASTE.

As previously remarked, to prevent injury by black spot (*Fusicladium*) rows 1 and 6 and 7 were sprayed once with Bordeaux paste, and rows 2, 6, 8, and 9 with Bordeaux mixture of normal strength. When harvesting the fruit Mr. Wishart examined the Cleopatra for the presence of this fungus, and made a record based on the pustules, counting each one aggregating to the size of a threepenny piece as one unit. Of 2,080 fruits gathered from the trees sprayed with the Bordeaux mixture, 14 units were recorded, whilst from 2,309 apples harvested from those sprayed with the Bordeaux paste, 118 units were counted. This, however, can be scarcely taken as conclusive

because the fruits of the other varieties were not examined for black spot, and no record was made of the condition of the windfalls of any variety in respect to this disease.

In conclusion, it gives the writer much pleasure to express his appreciation of the great and intelligent care shown by Assistant Inspector Wishart in carrying out this test. Only one who is imbued with the true spirit of research could endure the tedious character of such a task, the details of which are only summarised in this report. Thanks are also due to Messrs. Kennedy, Denholm, and other members of the Lyndoch Branch of the Agricultural Bureau for assistance rendered in various ways.



DISEASES OF FARM ANIMALS.

BY OFFICERS OF THE STOCK DEPARTMENT.

No. 3.—Digestive Disorders of the Horse.

(Continued from page 128, September issue.)

The diseases of the digestive organs of the horse are the most commonly encountered of all the maladies which affect that animal, and as they are as a rule caused through errors in diet of one kind or another, it is quite an easy matter to guard against them.

A brief description of the principal ailments and conditions will prove helpful.

LAMPAS.

This is to a great extent an imaginary disease. At the back of the upper incisor teeth is found what is called the dental pad. This pad is elastic and very vascular. When it becomes swollen and level with the teeth it is called lampas. It seldom occurs except in young horses, when the milk teeth are being shed and the permanent teeth coming through the gums. When the condition is present the membrane may be slightly painful, and the horse may lose its appetite. It is quite a common opinion amongst horseowners when a horse is not feeding well that the loss of appetite is due to lampas, and it is often quite impossible to convince them to the contrary.

By way of treatment it is usually sufficient to give a little saline medicine, such as 2ozs. of Epsom salts daily in feed or water. Allow soft food, such as scalded chaff and bran and a little boiled linseed. If the trouble continues use a mouth wash, such as ½oz. of alum or borax in a pint of water. The old practice of burning the lampas with a hot iron is barbarous and cruel, and is punishable by law.

DENTAL IRREGULARITIES.

In all cases where horses quid their feed, show pain or difficulty during mastication, either by holding the head on one side during feeding, slobbering, or suddenly ceasing from chewing during feeding, the teeth should be carefully examined. The most common trouble is caused by undue sharpness—that is, the outer edge of the upper and the inner edge of the lower molar (double) teeth become sharp and ragged. It must be borne in mind, however, that the upper molars are normally levelled from within outwards, and the lower *vice versa*, and it is only when this condition becomes exaggerated that

the health of the animal is interfered with. The sharp edges should be removed with a tooth-rasp. For this operation it is better to have a gag, though this is not essential. Usually no restraint is required, a halter being placed on the head and the animal backed into a stall.

Where the teeth are very irregular the condition is known as a "step-formed" mouth. Another common defect is due to the first and last molar teeth in the upper and lower jaw not meeting each other exactly; the result of this is that portion of the tooth does not come into wear, and may become so long as to interfere with feeding. The projecting portions of the tooth may be removed with the rasp, or, if very large, may require the use of the tooth shears.

The mouths of young horses should be examined periodically to see that the milk teeth are being properly shed. It sometimes happens that a milk tooth persists and displaces the permanent teeth. In this case it should be removed with the tooth forceps.

At the present time most country districts are regularly visited by "equine" dentists, and though skilled and intelligent attention to the teeth is beneficial, it is obvious that any undue interference cannot be otherwise than harmful. Rasping the teeth, the removal of milk teeth where necessary, &c., can usually be done by stockowners themselves; but where the teeth are so irregular as to require the use of the tooth shears it is better if possible to have it done by a qualified veterinary surgeon.

ACUTE INDIGESTION.

This disease consists in engorgement of the stomach with food. It is especially likely to occur where horses are allowed large quantities of boiled food, where they are allowed to eat to excess after prolonged fasting, and where by accident they gain access to wheat or other grain. Greedy feeders are predisposed to this disease.

In this disease the stomach becomes distended with food and its walls become paralysed, the food also undergoes further changes which distend the organ with gas. This condition is very fatal, and frequently leads to rupture of the stomach and death.

Symptoms.—In most cases there is at first a considerable amount of dullness, this is succeeded by abdominal pain, which increases in severity so that the animal appears to be mad (mad staggers); efforts at vomiting may be made, and a small amount of sour-smelling fluid escape down the nostrils. In other cases the animal appears only semi-conscious, and stands with the head down and the eyes half closed, or, if made to move, he reels and staggers in his walk. This (sleepy staggers) condition, however, may be succeeded by uncontrollable excitement, and if not relieved death soon follows.

Treatment.—The chances of recovery depend to a great extent on prompt treatment. Administer as a first drench medicinal doses of turpentine and

aromatic spirits of ammonia in raw linseed oil, and if there is much pain give medicinal doses of sulphuric ether and laudanum in a pint of water every three hours. As soon as appetite returns give food of a laxative character, and limit the amount.

CHRONIC INDIGESTION.

Chronic indigestion may be due to irregular feeding and watering, bad feed, sudden changes of feed, defective teeth, or to bolting feed imperfectly masticated. It shows itself in loss of condition, unthrifty appearance, and hide-bound condition of the skin. The appetite is capricious and irregular, and often depraved. the animal licking the walls of stable-soiled bedding, &c. There may be slight colicky pain, especially after feeding.

Treatment.—Look to quality and amount of feed; see that watering takes place before feeding. Have teeth attended to if necessary. If any worms noted in dung, treat accordingly. If due to ravenous feeding, give long hay first to take edge off appetite, and afterwards feed on oats or oats and chaff. The regular use of rock salt is beneficial. Give a tablespoonful of the following powder in feed twice daily :—Bicarbonate of soda, 2ozs.; powdered ginger, 2ozs.; powdered gentian, 2ozs.; mix. A dessert-spoonful of bicarbonate of potassium in the drinking water three times daily will assist in restoring tone to stomach.

COLIC.

This word is sometimes used in a wide sense to include a number of different diseases, in all of which, however, there is one symptom in common, viz., abdominal pain. In its more restricted meaning it includes two forms—(1) Spasmodic colic, (2) flatulent colic. Horses, on account of the anatomical structure of the stomach and intestines, are more liable to colic than any other animal.

SPASMODIC COLIC.

Spasmodic colic is that form of colic due to spasm or contraction of a portion of the small intestines. The majority of causes are connected with the food, such as unsuitable food, sudden changes in feed, &c.; chills are also believed to be a cause.

Symptoms.—The onset of the disease is sudden. There is severe abdominal pain. The animal paws with his fore feet, kicks at his belly, lies or throws himself down, rolls, stretches himself out as if trying to stale, looks round at side. The pain is intermittent, and between the spasms the animal may appear to be quite well. As the attack progresses the intervals of ease may become shorter and shorter, or relief may be obtained without treatment of any kind; if, however, the severity of the attack increases the case may be looked upon as dangerous.

Treatment should be directed to two points—the relief of the pain and stimulation of the bowels. Where no other medicine is available give the following drench :—Brandy, whisky, or other spirit, two wineglassfuls ; powdered ginger, a tablespoonful ; water, one pint ; mix. Chlorodyne, 1oz. or 2ozs. in a pint of water, every three hours is very effective for the relief of pain. An old and useful drench consists of laudanum and sweet spirits of nitre in doses of 1½ozs. given in a pint of raw linseed oil. Give frequent enemas of warm soapy water. Place the animal in a small paddock or large well-bedded loosebox, where he can roll about without injury.

FLATULENT COLIC.

Flatulent colic is due to fermentation of the food in the bowels, which become distended with gas. The most striking symptom is the drumlike distension of the belly. The pain is continuous, though not so violent as in spasmodic colic. The animal does not throw himself about, but is uneasy, pawing and attempting to lie down but is afraid to do so. The pressure of the distended bowel on the diaphragm interferes with the breathing. This form of colic is often due to succulent food, such as clover or lucerne.

Treatment.—It is necessary to give medicines which will dispel the accumulated gas. Turpentine, aromatic spirits of ammonia, 1½ozs. each in a pint of raw linseed oil is a useful drench ; and if much pain is in evidence give 1oz. doses of chlorodyne and hyposulphite of soda in a pint of water every four hours. Baking soda in two tablespoonful doses administered in a pint of water can be used when no other medicines are available. Give frequent enemas of soap and water.

IMPACTION OF LARGE BOWEL.

This is one of the most common of the digestive disorders of the horse. It is caused by overfeeding, especially on bulky food, insufficient and irregular watering. The obstruction is due to the accumulation of partly digested food in the bowel.

Symptoms.—There is a slight abdominal pain. The animal is dull and listless and disinclined to feed. As time goes on he shows more uneasiness and pain. He lies down carefully and stretches himself on his side. There is no movement of the bowel and no passage of dung. Later, as the pain becomes more acute, the animal walks around his box. Cases often last from 36 to 48 hours before fatal results follow.

Treatment.—The rectum should be cleared of any dung or obstructions, and enemas of soap and water may frequently be injected into rectum. Give medicines as for colic, and repeat as often as considered necessary. When pain ceases administer dose of purgative medicine and give laxative diet,

POULTRY NOTES.

BY D. F. LAURIE, POULTRY EXPERT.

OPERATIONS FOR OCTOBER.

Toe-punching Chickens.—A large proportion of our poultry keepers do not know the age of their poultry. As a result, many are kept long after they are profitably productive, and also a good many young hens are killed by mistake. A small leather punch can be purchased for 2s. This can be used for toe-marking the young chicks when first hatched. The punch mark is made in the web between the toes—the result is a small hole. For instance, all the 1911 hatched chickens are punched in the right foot, and a written record made and kept. It will act as a reminder in 1913 that such fowls as have a punch mark on the right foot are past work, and should be disposed of. Further details are contained with a list of punch marks in my pamphlet on “Single Testing Method of Breeding Poultry.”

Vermin.—With the advent of warm weather, vermin of various sorts will, if unchecked, increase and cause much loss. In many cases in the country the fowls roost in the stables and cowsheds, with the result that the woodwork becomes vermin infested, and the horses and cattle and people who go there are worried. There are many people who, while permitting this state of affairs to remain, would yet feel sore if their habits were stigmatised as dirty. Vermin-infested poultry are never profitable; infested chickens die wholesale. These vermin can be readily destroyed with kerosine, carbolic acid, formalin, or other insecticides. I often hear that kerosine and other deadly insecticides only stimulate these lively pests. On several occasions, in my office, I have shown some doubters that most of the insecticides are fatal even at half strength. I have arranged for the manufacture of a splendid germicide and disinfectant which I use at the poultry stations. It is more efficient and stronger than carbolic acid, and not so dangerous. The most common of what are called fowl lice is a small acarid, grey in appearance except when full of blood, when it is red. These live in woodwork of dirty fowlhouses and in the nests, and infest the birds at night. They also swarm on broody hens, causing their death if they do not desert the nest in time. They are blood-suckers. A long, yellowish, quick-moving species is generally found on the body of the fowls. It is not a blood-sucker, but causes abrasions on the skin, and is extremely irritating, and ultimately causes the death of the fowl so affected. The male birds, which rarely dust themselves, often swarm with these vermin and their eggs. Kerosine and oil, or a sheep dip, will destroy them. A somewhat similar species, grey in color, is often found on the heads of young chickens, which, as a consequence, soon mope and die,

Affected chickens can be treated with olive oil three parts and kerosine one part, applied with the finger or a small sponge. The tick swarms in the country, and will soon be in evidence. This pest must be eradicated, and I propose to take more vigorous action in this direction in the future. Most people are aware of the presence of tick in their poultry yard, and must take prompt action to eradicate them, otherwise their fowls and poultry houses may be destroyed under the Stock Diseases Act.

The Young Stock.—The chickens need liberal feeding on food consisting of as many varieties of grain as possible. There is a surprising want of knowledge among farmers and others on the score of foods and feeding. Most of our grains are deficient in minerals (various salts) which are absolutely essential for proper growth. In addition, no one food contains a sufficiently balanced nutriment. I find it necessary for this reason to make good the deficiency, and use a compound consisting of lime salts, sulphur, and phosphates. Many losses are due to defective poultry feeding. The subject is too technical to deal with in detail in these notes. Do not overfeed the chickens, but also do not starve them. Keep them always busily scratching in short straw—cocky chaff, &c.—in which is thrown a variety of cracked grains. Give plenty of green food, and see that there is always clean, fresh water.

Bowel Troubles.—Every year as soon as the weather warms up I receive numerous communications on this subject. The chief cause is lack of attention to the drinking water and the water pans. The water must be frequently renewed, and the pans must be scrubbed daily and disinfected. I am introducing a formula for an internal disinfectant and bactericide, which has proved effective in warding off and even curing attacks of diarrhoea and similar troubles. All drinking vessels should be kept in absolute shade.

Spare Stock Birds.—In response to many inquiries, I beg to state that there will be, in November, at the three poultry stations, a number of Orpingtons, Indian and Old English Game, Plymouth Rock, and Leghorns for disposal. The stock alluded to have been in the breeding pens, and some are about three years old. These birds are of splendid breeding and will serve for another year. The older hens will not, of course, lay a great many eggs, but this is a good chance to secure some good blood at a moderate price.

The Year's Hatching.—Although breeders have not quite finished hatching, it is satisfactory to report that the season has been a good one. I have seen a great many fine flocks of chickens. Some of the earlier-hatched pullets will lay next month. I have also seen several fine flocks of ducklings, which will meet a good market at Christmas.

Market your Early Chickens.—As soon as the Leghorn cockerels reach 2½ lbs. weight they should be penned up, well fattened for three weeks, and forwarded to the Light Square Depot for sale. Further particulars can be obtained on application to the writer,

BEE-KEEPING NOTES.

SWARMING.

BY T. E. WHITELAW, INSPECTOR OF APIARIES.

At the approach of the spring, in accordance with the edicts of nature, bees awaken from their winter state of semi-hibernation and recommence the labor of the coming season. The exact moment of revival varies as regards the district in which the bees are situated ; but it is usually concurrent with the advent of warm weather, which promotes the growth of the early plants that yield the honey and pollen so necessary for the promotion of the young brood. The almonds, dandelions (Cape weed), soursobs, tree lucerne, fruit; and other blossoms yield abundantly and stimulate the bees to activity. In certain districts the early yield is so profuse during warm weather that care has to be exercised to avoid the combs of the brood nest becoming clogged with honey, and so preventing the expansion of the brood cluster. At this period of the season the beekeeper's aim is to obtain a strong force of workers, so that the strength is there when the main honey-flow commences.

As the season matures, bees in common with other phases of animal life adopt means to ensure the propagation of their species, and this they do by swarming. To the uninitiated the issue of a swarm appears to be synonymous with disorder and disorganisation, but in reality it is an operation conducted with the greatest care and regularity.

Under normal circumstances the first swarm departs accompanied by the queen, and the bees, endowed with wonderful instinct, are aware that the parent hive cannot be left in a queenless state without the necessary means of reproduction. Therefore before swarming they prepare for this contingency, and seven or eight days previously several queen cells are built. Approximately about nine days afterwards the first of these is capped over, and it is usually about this time that the first swarm takes its departure. Sometimes the bees will issue irrespective of the age of the queen cells, especially if the weather is very warm, and on occasions will emerge without preparing cells at all. Should the queen from any cause fail to leave the hive the bees return and will again issue either on that day or the one following.

The swarm after circling in the air usually clusters on some object near by, and is then hived by the beekeeper. At times they are inclined to roam farther afield, and the beekeeper has to make them cluster by spraying them with water. After the first swarm has left the hive the young queen larvæ

grow to maturity, and from fifteen to sixteen days after the eggs were laid the first young queen leaves her cell and attempts to destroy her royal sisters. Her shrill piping can often be heard on listening beside the hive. If the colony is very strong the bees prevent her destructive efforts, and the excitement and turmoil of the moment eventuates in her leaving the hive with the second swarm. Should, however, the bees decide against any further swarming, they will assist her in the destruction of the remaining queen cells.

A great controlling influence lies in the hand of the apiarist at swarming time, and in many instances upon the methods adopted at this period depend the profits that will accrue during the principal honey-flow. The methods of manipulation must adapt themselves to the conditions that obtain in the district—the climate and the periods of the honey-flows. What is suitable in one district may not attain the best results in another, for so much depends on the sequence of the flows and the quiescent periods that come between them.

In those places where swarming is early, followed by a moderate incoming of nectar before the main flow starts, it is usually profitable to encourage swarming (unless increase is undesirable), because the lapse of time prior to the principal flow enables the apiarist to get the swarm and the parent hive into the pink of condition for the harvest.

Second swarms, or casts as they are sometimes called, are not usually permitted, as the parent hive becomes too depleted to be of much utility for honey-gathering purpose, and the swarm is usually too weak to do good work. Their only good point is that they possess young queens and make excellent stock for the next year. They are easily prevented after the issue of the first swarm by nipping out all queen cells with the exception of one—the best.

Where the flow of honey follows quickly after the swarming it is not wise to allow the bees freedom in the matter of swarming, as there is insufficient time to bring the hives to the required strength. Artificial swarming has much to recommend it to the capable apiarist. By its means he is able to regulate the number of his swarms to a nicety, and to ensure by careful selection the propagation of his best strains, bringing them into existence at a time suitable to his arrangements. Every season much valuable time is wasted in watching for natural swarms, or else in continually examining the hives to prevent them.

A method I adopted some seasons ago proved very successful, and has some good points to recommend it. At that time I was running an apiary of 100 hives in a district which was not one of the best. Experience in that neighborhood had taught me that it was not wise to run a queen more than two years, and that, as a general rule, hives headed by queens in their first year invariably did the best. I had the use of a cool, dry cellar, which was ventilated and absolutely dark, and this facility played an important part in the method of procedure adopted.

Early in the season several good hives of bees were selected, sufficient to rear queen cells for all the hives in the apiary. Two hives were chosen for the purpose of breeding drones from the best strain. These hives were forced ahead by stimulative feeding, and the first-mentioned hives were started on rearing queen cells from selected larvæ. The "drone" hives had had frames of drone comb inserted some time previously, so that drones were produced in abundance and were flying freely before the queen cells were ready to hatch. These drones were also flying well before any of the other drones in the apiary, ensuring in most instances that the young queens would mate with these selected males.

When the queen cells were 10 to 12 days old, nuclei were formed from every hive in the apiary, each being composed of a frame of honey and pollen and a frame of hatching bees. These frames were removed from the hives with the bees attached to them, care being taken to leave the queen in the parent hive. Each one of these nuclei was supplied with a queen cell in a West's cell protector, and the bees were confined to the hive by means of an entrance zinc. The nuclei were then placed in the dark cellar for two days. At the end of this period of confinement they were brought out and placed one beside each of the hives in the apiary. The bees remained with the nuclei and did not return to the parent hive. Where a cellar is not obtainable the same object can be attained by removing the bees outside the flying radius and returning them when the young queens are safely fertilised. Every few days during the swarming period the parent hives in the apiary were examined and, when the strength permitted, frames of hatching bees were transferred to the nucleus beside it. The parent hives were prevented from swarming, while the nuclei were built up into strong colonies by the time the honey-flow commenced.

Moreover, towards the end of the honey-flow, as much increase was not desirable, the old queens in the parent hives were in many instances killed and the nuclei standing beside headed by young queens were united up, forming a double force to finish the harvest, and eventually to go into winter quarters with the best packing "bees." Care was exercised not to leave the uniting till late in the season. It was invariably performed before the honey-flow was finished, so that the danger of robbing during the wholesale uniting was reduced to a minimum.

To make artificial swarming a success the following conditions are necessary:—(1) The operations should be performed in fine weather during a slight flow of nectar. (2) Drones should be flying in the apiary. (3) The brood must be kept from chill. (4) For most methods of artificial swarming queen cells have to be reared before the operations.

One useful method which is often adopted is as follows:—During sunny weather, when the bees are flying freely take five frames of brood and eggs, shaking all the adult bees back into the hive. These frames are then placed

in a new hive and both hives are filled with empty combs. Another hive is then removed from its position, and the new hive is placed in its place. The latter will then receive the flying bees, which should be sufficient to keep the brood in the five combs free from chill. If possible a queen should be caged on one of the combs and released 36 hours afterwards, or in lieu of this a sealed queen cell should be given. Should neither of these be available the bees can rear a queen from the eggs. By the above method it is seen that one hive supplies five combs of brood and stores while the other furnishes the adult bees to cover them.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, September 6th, there being present Messrs. A. M. Dawkins (Chairman), C. Willcox, G. R. Lafer, J. W. Sandford, Cleland, C. J. Valentine, C. J. Tuckwell, A. J. Perkins, Col. Rowell, C.B., and G. G. Nicholls (Secretary).

A number of formal matters in connection with the Annual Congress was attended to, and the following gentlemen were approved as members of the undermentioned Branches :—Messrs. W. Goldsmith, Morphet Vale ; M. Browne, Narridy ; J. Maxwell, J. Pleuckhahn, W. Scales, H. J. Wishart, and Frost, Saddleworth ; F. Shepard, M. D. Kenny, Geo. Lewis, and Gerald Lewis, Colton ; T. H. Muller, H. Leskie, B. Kitto, and G. Parsons, Morehard ; H. V. Thompson, Keith ; H. Tester, Clarendon ; G. L. Toop, Kingston ; F. L. McDougall, Renmark ; H. Piecraft, W. Taylor, W. Coward, E. Neate, G. Victorsen, J. Evans, and W. Hicks, Clare ; H. E. Watson, Coonalpyn ; F. W. Altus, Wilkawatt ; F. Sinkinson, Forest Range ; W. Barnett, Kingscote ; H. Chamberlain, Woodside ; J. Tozer, Cherry Gardens ; — Porter, Greenpatch ; E. P. Lyons, Maitland ; T. Shedlick, Bute ; D. T. Aitken, H. K. Gum, Hurtle Gum, L. Mills, and D. O'coran, Amyton ; C. Starr, H. Lieblich, and T. Klingberg, Arden Vale ; R. Polder and A. Polder, Coomooroo ; H. M. Wilson, Miltalie ; T. E. Mulner, Renmark ; C. Westphal, Northfield ; T. Ferguson, J. Norsworthy, and F. Copping, Lucindale ; T. Modra, Yorketown ; G. Hill, Hartley ; L. R. Blight, L. Hughes, A. Gray, F. Gray, H. Bauer, and Basley, Willowie ; J. L. Murphy, Betaloo Valley ; A. Henschke, Hookina ; A. G. Luff and W. Sanders, Penong ; H. A. Wohlers, Naracoorte ; and H. Thomas, Petina.

The re-election of the following gentlemen as members of the undermentioned Branches was approved :—Messrs. C. E. Birks, T. E. J. Teague, E. J. Hector, and E. J. Eagle, Port Pirie ; W. E. Muspratt, H. Howie, H. Delwitte, and E. Pitt, Renmark ; J. Alexander, D. Fullarton, E. F. McBain, R. H. Maxwell, and P. H. Kelsley, Penola ; E. C. Mills, Amyton,

THE WHEAT MARKET.

During the first week in September there was a marked improvement in the tone of the wheat market, the price on trucks at Port Adelaide on September 6th being 3s. 7½d. per bushel. The advance, however, was not sustained, and following on the weaker rates quoted in Great Britain, the quotations on the local market on September 8th was 3s. 6d. per bushel, at which figure, with but little variation, it remained during the rest of the month.

Writing on September 1st, *Beerbohm's Evening Corn Trade List* states—“The tone of the wheat market during the past week has been steady to firm, although on most days the demand was only moderate. Yesterday, however, quite a fair trade was done in cargoes, the reason given for the increased demand being the uncertainty felt regarding the outcome of the political troubles between France and Germany; but probably the continued unfavorable crop reports from Russia, and the firmness of shippers were the principal reasons. . . . In the early part of the week the market derived some assistance from the reports of damage by frost to the Canadian crop; but the movement in prices on the other side do not point to this damage having been at all serious. It is still generally estimated that the total yield of spring and winter wheat will be in the neighborhood of 200 million bushels against 150 million bushels last year. From Russia, the latest reports regarding the yield of the last crop are, if anything, even more unfavorable than those previously received, and would point to Russia having produced very little more wheat this year than sufficient for her own consumption. If such is the case, it will depend entirely on the quantity of old wheat carried over from the two last crops as to the surplus available for export during the present season. . . . The cables received from India this week have been much more favorable, good rains having fallen in the Punjab and the United Provinces, is that there remain only a few districts where rains are now urgently wanted. It is quite certain that, owing to the deficiency in the native food crops caused by the recent drought, more wheat will be consumed in India than would otherwise have been the case; but stocks are so large that, unless the prospects for the next crop later on are very unfavorable, exports are expected to be liberal all through the season. Very favorable reports continue to be received regarding the crop outlook in the Argentine, which is reported to be most promising at the present time; but several months must elapse before the crop will be safe.”

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE.			MELBOURNE.			SYDNEY.		
		Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.
Sept. 6	Strong and rather dearer; Liverpool hold for advance	3/7	3/8½	3/7½	3/8½	3/7½	3/7½	3/7½	3/7½	3/7½
7	Dull, with easier tendency; Sept.-Oct., 4/8	3/6	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
8	Steady, but quiet	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
9	Steady, but quiet; Oct.-Nov., 4/3½	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
11	—	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
12	Quiet; Liverpool firm, but quiet	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
13	Dull, easier tendency; Liverpool dull	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
14	Dull, and offered lower	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
15	Very dull, and offered lower; Liverpool neglected	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
16	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
18	—	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
19	Very dull, and lower to sell; Liverpool steady, but no demand	3/5½	3/7½	3/7½	3/7½	3/7½	3/7½	3/7½	3/7½	3/7½
20	Very dull.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
21	Firm, rather dearer; June-July, 4/6½	3/6	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
22	—	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
23	Quiet, steadier tone, but not active	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
25	—	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
26	Firm, but quiet; Liverpool steady, but not active	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
27	Very dull, and lower to sell	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
28	Dull, and opened lower; off coast, 4/5½	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
29	Market quiet	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
30	Steady, but quiet	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
Oct. 2	Market firm; Liverpool market steadily held	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
3	Dull with easier tendency	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
4	Slow and rather lower	3/5½	3/7½	3/7½	3/7½	3/7½	3/7½	3/7½	3/7½	3/7½
5	—	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.

STEAMER FREIGHTS.—Steamers from South Australia to United Kingdom-Continent, full cargo rates 27s. 6d. per ton (8½d. per bush.). Parcels, Port Adelaide to London-Liverpool, 26s. per ton (8d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SAILER FREIGHTS.—From South Australia to United Kingdom-Continent, old wheat, 26s. 3d. per ton (8½d. per bush.); new season, 27s. 6d. per ton (8½d. per bush.); to South Africa, 22s. 6d. per ton (7½d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for September, 1911, at the undermentioned stations, also the average total rainfall for the first nine months in the year, and the total for the first nine months of 1911 and 1910 respectively :—

Station.	For Sept., 1911.	A'v'ge. to end Sept.	To end Sept., 1911.	To end Sept., 1910.	Station.	For Sept., 1911.	A'v'ge. to end Sept.	To end Sept., 1911.	To end Sept., 1910.
Adelaide	3.80	16.76	13.60	20.26	Hamley Bridge	2.30	13.12	11.71	17.45
Hawker	1.56	9.38	7.49	15.82	Kapunda....	2.15	15.88	12.69	19.24
Craddock	1.21	8.40	6.48	13.07	Freeling.....	1.96	14.23	11.93	18.59
Wilson.....	1.41	9.09	6.08	15.94	Stockwell....	1.80	16.29	13.82	17.78
Gordon.....	1.07	6.77	5.97	10.05	Nuriootpa...	2.04	17.11	11.67	20.62
Quorn.....	1.22	10.74	6.97	16.20	Angaston...	3.29	17.47	18.28	22.32
Port Augusta	1.16	7.10	7.12	15.80	Tanunda.....	2.93	17.85	19.02	22.27
Port Germein	1.60	9.65	8.62	18.58	Lyndoch...	2.50	18.62	15.19	21.29
Port Pirie...	1.46	10.13	11.00	22.49	Mallala.....	3.09	13.43	12.99	17.43
Crystal Brook	2.66	11.89	12.81	19.20	Roseworthy..	2.10	13.93	10.78	18.45
Pt. Broughton	1.58	11.40	11.12	17.13	Gawler.....	1.99	15.58	11.46	19.50
Bute.....	1.95	12.35	14.13	21.06	Smithfield..	1.96	13.19	12.07	19.38
Hammond..	1.71	8.29	10.92	16.94	Two Wells...	2.10	14.53	10.21	18.76
Bruce.....	1.10	6.90	5.64	15.74	Virginia.....	2.07	14.18	10.99	20.25
Wilmington..	2.23	14.12	13.15	22.86	Salisbury....	2.38	14.96	14.43	20.10
Melrose.....	2.37	18.43	14.44	28.06	Teatree Gully	3.03	22.62	16.65	24.70
Booleroo Cntr	1.66	12.41	8.93	19.19	Magill.....	3.03	20.91	16.64	22.08
Wirrbarra...	2.62	14.84	11.07	24.14	Mitcham.....	2.97	21.92	15.73	21.21
Appila.....	1.65	11.44	10.57	22.69	Crafer's.....	4.32	38.48	35.44	43.96
Laura.....	2.18	13.89	12.76	25.87	Clarendon...	4.77	33.17	25.43	28.22
Caltowie....	1.87	13.28	13.21	19.67	Morphett Vale	3.50	19.18	17.46	21.34
Jamestown..	2.23	13.30	14.64	20.78	Noarlunga...	3.73	16.71	17.32	21.01
Gladstone..	1.86	12.26	12.74	17.51	Willunga...	3.81	21.60	22.71	26.13
Georgetown..	2.38	14.46	13.70	22.30	Aldinga.....	3.35	16.84	15.72	20.42
Narridy.....	2.30	13.43	13.92	17.68	Normanville..	2.85	17.27	16.16	23.16
Redhill.....	2.04	13.14	11.83	23.19	Yankalilla...	4.35	18.62	20.32	31.38
Koolunga...	1.64	12.32	11.36	21.54	Eudunda.....	1.69	13.42	13.07	25.65
Carrieton...	1.99	9.12	8.48	18.17	Sutherlands..	0.73	—	7.73	13.95
Eurelia.....	1.86	10.09	8.77	17.58	Truro.....	2.41	15.58	14.04	21.27
Johnsburg..	1.35	7.41	7.04	14.17	Palmer.....	1.97	—	10.53	17.08
Orroroo....	1.10	10.47	7.51	16.81	Mt. Pleasant.	2.77	22.35	18.59	24.74
Black Rock..	0.77	9.17	8.15	17.71	Blumberg....	3.32	24.62	19.75	25.82
Petersburg..	1.08	9.87	9.30	15.73	Gumeracha...	3.24	27.42	22.59	29.13
Yongala....	1.57	10.49	10.59	16.11	Lobethal....	2.98	29.96	24.43	29.61
Terowie....	1.07	10.22	9.10	19.01	Woodside....	3.21	26.08	24.20	30.36
Yarcowie....	1.58	10.53	10.75	20.01	Hahndorf....	3.73	20.43	28.86	32.58
Hallett.....	1.65	12.80	11.91	18.08	Nairne.....	3.02	23.77	24.27	28.17
Mount Bryan	1.92	12.65	10.88	18.71	Mt. Barker...	3.79	25.65	24.42	28.04
Burra.....	1.95	14.20	12.96	21.25	Echunga....	3.74	26.97	27.47	32.37
Snowtown...	1.45	12.54	9.85	18.85	Macclesfield.	3.54	25.09	24.46	30.96
Brinkworth..	2.46	11.67	12.02	20.19	Meadows....	4.53	29.15	29.17	36.29
Blyth.....	3.12	12.91	13.54	18.05	Strathalbyn..	3.75	15.56	17.15	21.91
Clare.....	3.89	19.69	18.67	26.36	Callington...	1.78	12.86	10.96	15.71
Mintaro Cntrl	2.95	17.75	16.80	34.04	Langh'rne's B	2.19	12.29	10.59	20.60
Watervale...	3.84	22.19	20.03	25.00	Milang.....	2.71	13.68	9.21	12.08
Auburn....	2.87	19.53	17.73	27.05	Walleroo...	2.39	11.29	13.83	16.73
Manoora....	2.27	14.47	12.20	18.25	Kadina.....	2.33	13.13	13.13	16.74
Hoyleton....	2.28	14.66	13.44	16.41	Moonta.....	2.08	12.44	11.88	13.86
Balaklava...	1.82	12.68	12.16	17.33	Green's Plns.	1.65	12.80	9.88	16.63
Pt. Wakefield	1.37	10.59	13.91	14.21	Maitland....	2.63	16.58	16.60	18.06
Saddleworth.	2.00	16.10	12.58	18.81	Ardrossan...	1.56	11.35	10.96	14.32
Marrabel....	1.50	14.34	9.87	18.71	Pt. Victoria..	1.94	12.50	13.58	14.63
Riverton....	2.41	16.47	14.83	22.93	Curramulka..	2.17	15.50	13.55	19.09
Tarlee.....	2.27	13.87	11.43	17.40	Minlaton...	2.17	14.60	12.88	18.14
Stockport...	2.06	12.80	10.27	14.65	Stansbury...	2.21	14.04	14.20	18.12

RAINFALL TABLE—continued.

Station.	For Sept., 1911.	A'v'ge. to end Sept.	To end Sept., 1911.	To end Sept., 1910.	Station.	For Sept., 1911.	A'v'ge. to end Sept.	To end Sept., 1911.	To end Sept., 1910.
Warooka....	2-72	14-01	17-24	19-53	Bordertown .	1-56	15-65	12-92	16-48
Yorke town .	2-50	14-72	13-90	18-86	Wolseley....	1-97	13-71	11-87	18-01
Edithburgh..	2-78	13-69	12-62	19-22	Frances.....	1-49	15-74	16-20	19-40
Fowler's Bay.	1-10	10-51	11-71	9-30	Naracoorte .	2-04	17-89	17-08	22-50
Streaky Bay.	1-75	13-28	14-38	14-95	Lucindale ...	2-46	18-81	19-66	24-56
Pt. Elliston..	2-57	14-00	16-71	17-19	Penola.....	2-51	21-44	21-53	26-18
Pt. Lincoln..	1-91	17-11	15-26	20-02	Millicent	2-03	24-89	27-09	30-86
Cowell	0-95	9-49	8-79	11-02	Mt. Gambier.	3-06	25-53	27-51	34-86
Queenscliffe .	—	15-57	—	—	Wellington ..	1-78	11-90	10-39	15-04
Pt. Elliot....	2-98	17-12	14-47	19-09	Murray Bridge	2-25	11-16	9-32	17-78
Goolwa	3-49	14-62	15-59	19-27	Mannum	1-41	9-39	6-40	15-00
Meningie.....	2-46	15-64	12-77	16-96	Morgan	1-05	6-66	6-72	11-80
Kingston....	2-66	20-47	19-13	24-62	Overland Crnr	1-40	8-37	9-45	15-64
Robe	1-89	20-91	19-91	26-55	Renmark ...	1-43	7-73	9-04	13-20
Beachport....	1-67	22-89	25-45	30-41	Lameroo ...	2-11	—	12-02	15-53
Coonalpyn ..	1-44	14-07	12-25	13-76					

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on October 2nd :—
BUTTER.

This month's supply of cream has exceeded that of any month since the inception of the factory. The quality of the butter is up to the usual high standard, and the demand is increasing steadily. The price of the butter has varied very little during the month, the present prices being—Superfine, 1s. per lb.; pure creamery 11d. per lb.

A. W. Sandford & Co., Limited, report on October 2nd :—

BUTTER.—The more favorable weather which prevailed during September brought along increased supplies of both butter and cream. Values eased about 1d. per lb., especially for medium-flavored creamery and ordinary separators and dairies; other grades met with brisk sale. Best factory and creamery, fresh, in prints, from 10d. to 11½d. per lb.; choice separators and dairies, from 9½d. to 10½d.; fair quality lots, 8½d.; stores and collectors', from 8d. to 8½d.

EGGS.—The flush of the season is practically on, but, although quantities are heavy, extensive buying orders for the inter-State trade have kept the rooms well cleared. Prime guaranteed new-laid, hen, 7½d. per doz.; duck, 8d.

CHEESE.—This has had a big month's business, but as quantities are now more in keeping with the demand, prices are disposed to ease in order to meet the export trade. New season's makes, from 6½d. to 7½d. per lb.; matured, up to 8½d.

BACON.—This line has recovered from the dulness that ruled during the winter, curers finding an improved trade for established brands of prime factory sides and middles, but hams are still quiet. On the other hand, farmers' lots generally have been slow of sale. Factory-cured sides, from 6½d. to 7½d. per lb.; middles, 7d. to 7½d.

HAMS.—In calico, 9½d. to 10½d. per lb.

LARD.—In skins, 5½d.; bulk, 5d.

HONEY.—For several months this line has met with active demand, especially for prime clear extracted consignments at 3d. per lb.; beeswax, 1s. 2d.

LIVE POULTRY.—The prosperous times are, no doubt, responsible for the higher prices that continue to rule for poultry, keen bidding being the rule at the auctions for all coops of prime conditioned birds. Good table roosters, from 3s. 6d. to 4s. 1d. each; plump hens and nice conditioned cockerels, from 2s. 3d. to 3s.; light sorts, from 1s. 9d. to 2s.; ducks, from 2s. 6d. to 3s. 6d.; ducklings, 1s. 6d. to 2s. 3d.; geese, 3s. to 3s. 6d.; pigeons, 8d.; turkeys, from 7½d. to 10d. per lb. live weight, for fair to good.

POTATOES.—The last month opened with stocks of Gambier grown potatoes decidedly heavy for the time of the year, and a pleasing feature is the substantial trade that was recorded and the prices sustained. Quotations—£3 7s. 6d. to £3 10s., on trucks, Gambier, per ton of 2,240lbs.

ONIONS.—As it is now late in the season sales have only been of a moderate character. Quotations—£3 10s. to £3 15s. on trucks, Gambier, per ton of 2,240lbs.

AGRICULTURAL BUREAU.

TWENTY-THIRD ANNUAL CONGRESS.

A LARGELY-ATTENDED GATHERING.

The Twenty-third Annual Congress of the Agricultural Bureau was opened at the Adelaide School of Mines by the Minister of Agriculture (Hon. J. P. Wilson, M.L.C.) on September 11th, at 8 p.m., continued on the 12th, and concluded on the following evening.

During the sittings the following delegates attended:—Amyton—W. Gum, A. Crisp; Angaston—S. O. Smith, R. Player; Appila-Yarrowie—J. H. Bottrall, J. W. Lines; Arden Vale and Wyacca—W. Klingberg, W. Fricker; Arthurton—J. B. Rowe; Blyth—C. Lehmann, W. J. Ninnes; Balaklava—R. S. Goldney, E. Fisher; Beetaloo Valley—J. Burton, A. Bartrum; Belalie North—P. Fox, J. Arnot; Bowmans—J. S. Lemmans, R. E. Gale; Bowhill—J. T. Tregilgas, J. G. Schenke; Bute—F. Masters; Butler—S. M. Bawden; Caltowie—J. G. Lehmann, G. Petitz; Carrieton—E. W. Radford, F. Byerlee; Cherry Gardens—C. Ricks; Clare—D. McKenzie, P. H. Knapstein; Clarendon—T. B. Brooker, A. Phelps; Colton—W. J. McBeath; Coomooroo—H. Avery, E. C. Brice; Coonalpyn—H. Bone, A. H. Fidge; Cradock—J. Patterson, A. Jago; Crystal Brook—H. Billingham, M. Weston; Cummins—H. L. Hancock; Davenport—A. Bothwell, J. Roberts; Dawson—H. H. Baker; Elbow Hill—W. T. Cooper, A. O. Chilman; Forster—C. Hayman, Jas. Searle; Frances—F. H. G. Pfitzner, M. Watts; Freeling—J. A. Mattiske, sen.; Gawler River—A. J. Bray, A. J. Davis; Georgetown—John Myatt, S. Eyre; Geranium—W. Mitchell, W. Pannell; Gumeracha—J. Porter, B. Cornish; Hartley—J. F. Tydemann, W. Bermingham; Hawker—J. Smith; Hookina—Aug. Henschke; Kadina—J. Malcolm, Thos. Roach; Kalangadoo—D. W. Tucker, A. Rake; Kanmantoo—H. Shepherd; Keith—J. A. Lock, W. H. Morcombe; Kingscote—D. C. Murray, C. C. Castine; Kingston—R. Jackson, S. F. Barnett; Kybybolite—A. R. Scholz, H. M. Koth; Lameroo—W. J. Trowbridge, S. R. Sinclair; Leighton—A. E. McDonald, A. E. McWaters; Lipson—E. J. Barnard; Lucindale—W. G. Secker, M. Beaton; Maitland—J. Hill, E. J. Jarrett; Mallala—A. V. Nairn, F. M. Worden; McGillivray—R. Wheaton; Meningie—W. H. Mincham, F. P. Ayres; Millicent—G. Mutton, H. Hart; Miltalie—F. F. Alm, Francis Jacobs; Monarto South—A. P. Braendler, Chas. Hill; Monteith—J. F. Connell, W. G. Gunn; Moonta—H. J. Nankivell, W. T. Orloff; Moorlands

—L. Spur, C. S. Fead; Morchard—J. B. McDougal, W. Toop; Morphett Vale—A. C. Pocock; Mount Bryan—H. L. Hatherley, J. Trallagan; Mount Bryan East—J. Doyle, B. H. K. Dunstan; Mount Gambier—A. J. Wedd, D. Collins; Mount Pleasant—F. Langford; Mount Remarkable—L. George, N. S. Giles; Mundoorra—J. A. Owens; Nantawarra—W. Greenshields, W. Sinith; Naracoorte—L. Wright, C. Bray; Narridy—A. Liddle, P. Haren; Northfield—D. Rowe, W. J. Kimber; Orroroo—W. S. Lillecrapp; Parrakie—F. J. Dayman, A. C. G. Hammond; Paskeville—J. P. Pontifex, T. R. Brinkworth; Penola—H. Richardson, A. H. Strong; Petina—J. H. Wharf; Pine Forest—D. Carmen, R. D. Goodridge; Port Broughton—P. E. Pettingale; Port Elliot—H. B. Welch, J. Brown; Port Germein—A. Carmichael, W. Holman; Port Pirie—W. Munday, H. G. Hawkins; Quorn—A. F. Noll, C. Patten; Redhill—M. M. Coffee, F. A. Wheaton; Saddleworth—R. G. Townsend, P. Manning; Salisbury—W. H. Neal, A. G. Jenkins; Shannon—J. Cronin; Sherlock—C. J. Osborn, J. B. Coombe; Stockport—T. Megaw, S. Nairn; Strathalbyn—J. W. C. Fisher; Tatiara—T. Stanton, T. Truman; Utera Plains—W. H. Gale, A. Barber; Waikerie—J. E. Burton, J. J. Odgers; Warcowie—T. Donnellan, J. Feineler; Watervale—E. E. Sobels, F. Burgess; Wepowie—G. Rooke, J. Crocker; Whyte-Yarcowie—H. M. Pascoe, R. Ward; Wilkawatt—D. F. Bowman, W. J. Tylor; Wilmington—W. Slee, D. S. George; Wirrabara—P. J. Curnow, A. Woodlands; Woodside—J. Lauterbach, H. Rollbusch; Willowie—T. Hawke, W. P. Foulis; Yongala Vale—C. Fowler, E. Fowler; Yorketown—C. Domaschenz, M. F. Rohrig; Yadenarie—A. Jericho, J. Whyte.

Mr. A. M. Dawkins (Chairman of the Advisory Board of Agriculture) presided, and asked the Minister of Agriculture to declare the Congress open.

THE MINISTER'S ADDRESS.

The Minister of Agriculture, who on rising met with a cordial reception, said—

“Let me congratulate the members of the Bureau in attending this Congress in such large numbers. I trust that you will have a very successful Congress. It is well that those interested in the agricultural pursuits of the country should meet together from time to time to exchange ideas and experiences, and thus benefit themselves and the people of the State generally. I congratulate the Bureaus on the good work they have done during the past year; and I know beyond a doubt, because the minds of those engaged in the agricultural industry are the most keen perhaps of any, that their future work will be no less beneficial than it has in the past. (Applause.) I fully recognise that the work which has been undertaken by the Bureaus in the various districts has been of great help to the department over which I have the honor to preside. This is the second occasion on which I have had the honor to address, as Minister of Agriculture, the opening meeting of the

Agricultural Bureau Congress in Adelaide. May I express the hope, though not perhaps in accord with the wishes of all present, that I may have further opportunities of addressing such Congresses in a similar capacity in future.

THE AIM OF THE GOVERNMENT.

"The Government of which I have the honor to belong are keenly alive to the agricultural requirements of our country. I do not claim that that is peculiar to the present Government, but I do say that no Government has been keener or could be keener than are the present Government in their desire to further the interests of the agriculturists of this State.

PROFESSOR LOWRIE.

"I want now to give you some idea of the work which is being done by the Agricultural Department. During the year a number of changes have taken place in the department, and since I had the honor to open the last Congress there has been a change in the *personnel* of the Director. To-night we have with us our old friend Professor Lowrie, who is filling the important position of Director of Agriculture as only Professor Lowrie can. (Applause.) The whole of the Agricultural Department is under Professor Lowrie's direction, and we certainly look for good results to accrue from that fact. Those who remember Professor Lowrie before he left South Australia some years ago will have a keen appreciation of the work he then did, and know that he will continue that good work so long as he remains Director of Agriculture in this State, which, personally, I hope will be for a number of years. (Applause.)

OTHER CHANGES.

"Another change which has taken place is that Mr. Summers, who was connected with the Agricultural Bureau for nearly 20 years, has relinquished that work to take up the important duties of Secretary to the Minister of Industry and Agriculture. Mr. Summers undoubtedly rendered very excellent service as Secretary of the Advisory Board of Agriculture. (Applause.) The work formerly undertaken by Mr. Summers will in future be performed by Mr. Nicholls. You are beginning to know Mr. Nicholls, and I am sure that those of you who have not met him will, when you become acquainted with him, appreciate the keen interest he takes in his duties. I trust you will give Mr. Nicholls the same loyal support and the same goodwill which in the past you extended to Mr. Summers.

"I very much regret the resignation of Mr. Richardson, who left us some months ago to undertake duties in Victoria, where he felt he would have a larger sphere of usefulness and greater opportunities of obtaining experience. I am sure I am voicing the feeling of all present when I say that we wish Mr. Richardson every success, no matter where his labors might take him. (Applause.)

THE TRADE COMMISSIONER.

"Another very important change made was brought about through Major Norton's resignation of the position of Trade Commissioner in England for South Australia. Major Norton has done Trojan work for the producers of South Australia, and we all, of course, regret his resignation. If there is one man on the other side of the world who has done his best for South Australia, so far as the State's productions are concerned, that man is Major Norton. No man has a greater love for his country than has Major Norton, no man has a keener knowledge of its requirements, and no man has done so much to open up new avenues of trade in London for South Australian products. Naturally, therefore, we wish him every success in his larger and freer sphere of work. I may state that Major Norton on resigning his office of Trade Commissioner made a special request to the Government to be appointed honorary lecturer for South Australia in Great Britain, and that the Government willingly gave him that commission. (Applause.) As Major Norton had resigned, it behoved the Government to find another man of competency and experience to take his place. The Government, on the recommendation of myself, appointed Mr. McCann to the vacant position. There is no doubt that many were disappointed at that appointment. Everyone else who was anxious to get it naturally felt that they could have filled the position better than the man who had been selected, no matter how competent the man chosen was. However, what weighed principally with the Government in making that appointment was that Mr. McCann was born in the State, he entered the Produce Department as office boy, worked up through all the departments of that particular section of the State's undertakings, and educated himself so as to fill with advantage the positions which he from time to time occupied. Should we not feel proud that one of our own lads who has received his training in the State has been regarded as competent to fill the important position of Trade Commissioner, representing the State in London? (Applause.) Mr. McCann will, I feel sure, go to his new duties with the good feeling of those he will leave behind him, and certainly with the fullest confidence of the Government resting in him.

THE STOCK DEPARTMENT.

"Another change has been brought about through the lamentable death of Mr. Needham, Chief Inspector of Stock. Mr. Needham was undoubtedly a very valuable officer, a man who was well known and who, I can say without any exaggeration, was beloved on account of his many manly traits by all with whom he came into contact. (Applause.) The Government have appointed Mr. T. H. Williams, a most capable and trustworthy officer, to take Mr. Needham's place; and, feeling that it is absolutely necessary to strengthen the Stock Department, we are immediately appointing an additional veterinary surgeon and two stock inspectors. I do not think that even that will meet

the exigencies of that particular department so far as veterinary surgeons are concerned, and I am engaged in working out a scheme, which I hope to finalise shortly, under which the country agricultural Bureaus will be divided into districts, each district being subsidised and given charge of a competent and highly skilled veterinary surgeon. (Applause.)

A VEGETABLE PATHOLOGIST.

"Arrangements have been practically completed with the University by which a botanist and vegetable pathologist will be appointed, part of whose duty will be to investigate plant diseases. I may state that South Australia is greatly indebted to Professor McAlpine, of Melbourne, who for over 20 years has assisted the department in this connection without fee or reward.

MR. RICHARDSON'S RESIGNATION.

"I have not yet been able to secure a successor to Mr. Richardson to take charge of the wheat-breeding work at Parafield. It is a very difficult matter just now to find men who have had the necessary training to fill positions such as that which was occupied by Mr. Richardson. There is a very keen competition existing between the States to-day so far as securing the services of high-class officers is concerned; in fact, the demand for scientific agriculturists throughout Australia has of late been so keen that it is doubtful whether we will be able to secure a man in the Commonwealth. If South Australia cannot supply a man, we will, however, exhaust the Commonwealth before trying elsewhere, as we feel that such positions should be filled by men in Australia if possible. The work, however, will not be interfered with, as Mr. Stevens (the departmental miller), who did all the cross-breeding last year, will carry on this section of the work until arrangements can be made for filling the vacancy caused by Mr. Richardson's resignation.

THE EXPERIMENTAL FARMS.

"There is marked activity in the experimental work of the department. In addition to numbers of experiments being carried out by farmers under the instructions of the Director, the various experimental farms are doing good work. It is unnecessary to refer at any length to the work that is being carried out at Roseworthy, as most of you have had opportunities of personal inspection of the work done there. On the experimental farms, primarily intended to assist in the developing of large areas of land in limited rainfall districts, a large amount of work is being done. At Loxton we have 600 acres, of which 200 acres are under crop, while at Veitch's Well, in the same district, 4,000 acres have been placed at the disposal of the Director, of which about 800 acres are in crop. At both places a wide variety of wheats are being carefully tested and experiments with manures carried out. Other experimental work is also being undertaken

with the object of helping settlers to decide the best course of procedure to obtain profitable returns. Last year Veitch's Well averaged 16bush. of wheat per acre, and the return this year promises very fairly. At Shannon Farm, on Eyre's Peninsula, we have 1,164 acres of scrub country, and here also pioneering work is being undertaken, which, in view of the immense areas of similar land in the western district, must be of great value to future settlers. Naturally for several years the land must be cropped more or less roughly for successive seasons to kill the mallee shoots, and this limits the scope of the experimental work. All these farms will, however, from the outset afford the settlers an opportunity of securing graded seed wheat of varieties which have been tested and proved suitable for the district. At Minburra the work in hand is the testing of the possibility of profitable wheat-growing under systematic cultivation in conjunction with sheep on these northern lands with a low rainfall. In view of the situation of this farm and the conditions under which it is held the department does not expect to make a profit on its operations. I shall be satisfied if the experiments prove that under a good system of cultivation reasonable crops can be grown. The question of whether such crops would be profitable under ordinary working conditions can be determined later on.

TURRETFIELD.

"Turretfield will be carried on as a stud dairy farm and seed wheat station under the Director of Agriculture, while Mr. Suter will in future spend a greater portion of his time amongst the factories and dairy-farmers. In addition to the breeding of dairy stock and experimental work in connection with this industry a large area will be devoted to the growth of pure seed wheat for sale to farmers, the demand for which is in excess of the available supply. An interesting experiment in irrigation is also being undertaken: some 28 acres of well-drained, deep alluvial land is being graded and sown to lucerne. This will be irrigated with water from the river, which, however, in the autumn contains a percentage of salts beyond what is generally considered safe to apply to crops. To overcome this it is intended to supplement it with water from the Barossa main. The experiments should enable the department to ascertain to what extent good natural drainage will extend the limit of toleration of salt in water used for irrigation, besides furnishing the necessary supply of greenfeed for the dairy stock during the summer and autumn months.

KYBYBOLITE.

"The work at Kybybolite and the South-East generally is under the charge of Mr. Colebatch, and extensive experimental work, which will have an important bearing on the future of the South-East, is being carried out. In addition we have irrigation experiment farms at Pekina, Berri, and Murray Bridge, so that it will be seen that the department is engaged in extensive and important work in this direction.

THE MOORAK ESTATE.

"I might also add in connection with our experimental work in the South-East that it is my intention to have set apart for the department somewhere about 70 or 80 acres of the Moorak Estate. I do not know that the land will be put to immediate use, but I believe in looking ahead and am inclined to think that the retention of a fair area of that estate will in the future prove beneficial."

Delegates—"You are keeping too much back." "The land is too valuable."

The Minister—"We are not keeping too much back. I think we should set apart a small area of that estate for future experimental work, and if by doing so we can by and by introduce a scheme which will give the dairy-farmers 6d. to 6½d. a gallon for their milk as against 3½d., I do not think they will regard the land as too valuable for the Government to hold. (Applause.)"

COW TESTING ASSOCIATIONS.

"I hope before long to make arrangements for the formation of Cow Testing Associations, as has been done in New Zealand with satisfactory results. In Queensland some of the most practical phases of agricultural and dairying work among children has been shown in connection with milk and cream testing in dairying centres. The department has given assistance towards procuring plants for this purpose. Reporting on one of these in the Harrisville district, a teacher of agriculture in the schools recently stated that milk and cream testing was most popular with both children and parents, and was doing much to improve the quality of the local herds. When the Government herd tester was around the district testing herds parents refused his services, saying that this branch of work was being well and faithfully done at school. That shows the nature of the work which can be successfully undertaken by the children of the State. It has proved successful in New Zealand and is proving equally successful in Queensland, and I purpose in conjunction with the Minister of Education moving in the same direction as early as possible."

THE PRODUCE DEPARTMENT.

"I now wish to say a few words about the Produce Department. As you probably know, two Parliamentary Committees are investigating the working of this department, and I am sure that their reports will show how useful this department has proved to producers. I do not propose to refer at any length to its work, but a few figures will be of interest. The total capital cost of that department to date amounts to £236,000, but a large proportion of this total is represented by experimental work of earlier years. When the works at the Port were first erected they were on a small scale, and from time to time they had to be enlarged and rearranged. Naturally, mistakes were made in the beginning, and these have raised the capital cost to a considerable extent."

"At the close of the past financial year the Produce Department had paid all working expenses and interest since inception, and there was a small balance to credit."

A Delegate—"Does that include the iceworks?"

The Minister—"The iceworks showed a surplus. For the 11 months of last year, allowing for depreciation, interest on the capital expenditure, and notwithstanding that the wages paid were higher than those previously paid, taking receipts with expenditure, the iceworks at Light Square came out on the right side. When it is remembered that during what might be called the experimental stage of the department, losses to the extent of £12,000 were incurred, it will, I think, be admitted that to have paid this off and met all current expenses during the past eight years is a satisfactory result. It may be mentioned that the total value of produce which has been handled by the department exceeds two and a half millions sterling, of which last year's work accounts for £500,000. That, I think, proves that the Produce Department, so far as the productions of our country are concerned, is no mean department for the Government to have under its control. While it has very largely benefited the producers of the country, the taxpayers have not been called upon to pay one penny towards the expenses of working that institution.

THE BUTTER FACTORY.

"The butter factory, in which many of you take an interest, has had a satisfactory year. The department has paid full market rates for all cream supplied, and let me point out that the suppliers are paid according to the quality of their cream. Our trading operations have been profitable, and we have been able to return, as a bonus to suppliers, the sum of £750 this year. The butter factory is practically a co-operative concern, and is run on sound commercial lines, and is so well appreciated by the producers that we have now 2,000 persons sending supplies of cream to the factory. If it was not for that co-operation on the part of the producers I could not have announced that gratifying result to you to-night.

MARKETS FOR PRODUCTS.

"The Government is spending a good deal of money in advertising South Australian products in Great Britain. At a number of the principal cities in England and Scotland the Trade Commissioner has put up very creditable exhibits of cereals, wines, fruits, &c., and as a result has had increased inquiries for these products. We must look for an extension of the markets for our products, and these shows will undoubtedly be an important factor in bringing them under the notice of retailers and consumers in the old country. This year we are extending our operations to the Royal Show at Dublin. The Government is putting £2,000 on the Estimates for this work, and in this the producers can materially assist the department in securing representative

collections of produce suitable for exhibition, so that new avenues of trade may be opened up. If any of you can supply good samples of grain or sheaves, dried or bottled fruits likely to be useful, I would like you to communicate with the General Manager of the Produce Department or with Mr. Summers. The department is prepared to pay all freight charges, and, where desired, will buy any exhibits considered suitable for the object in view.

SHIPPING FREIGHTS FOR PRODUCE.

"Having had the privilege of opening the Fruitgrowers' Conference last week, I do not propose to make any extended reference to this section of rural life. I must, however, refer to one point which is of great interest not only to fruitgrowers but to lamb-raisers and dairymen. I refer to the attitude of the shipping companies in respect to the carriage of frozen produce. Last year freights on lambs were raised; this year a further increase is sprung on shippers without any legitimate reason—the reasons given by the local agents have been proved to be absolutely groundless. The result, however, is that on every lamb, shippers now pay 6d. more for freight than they did three years ago, and this means that you get that much less for your lambs. I want to say that the shipowners or their agents are not giving us a fair deal in that particular. (Applause.) The same condition of things seems to apply throughout the Commonwealth. Perhaps you noticed that Mr. Graham, the Minister for Agriculture in Victoria, said recently that the time was very closely approaching when representations would have to be made to the Federal Government on the question, and an endeavor made to induce the Federal Government to either charter or build vessels of their own to carry Australian produce to the great oversea markets of the world, and thus give those facilities for export which the producers had the right to have.

CARRIAGE OF FRUIT.

"Then with fruit we are in the position that we have to engage space months ahead and, if for any reason the grower is unable to fill the space he has applied for, the companies compel him to pay full charges. Notwithstanding this, however, he has no surety that he can ship his fruit, as very often, when the boats arrive here, the shipper finds that he cannot get the space the company has contracted to supply. He is put to added cost in storing fruit besides running the risks due to delay in putting his fruit on the market. Such a one-sided arrangement is grossly unfair. (Applause.) Further than this the shipper has no control whatever over the way in which the fruit is carried. We have the spectacle of the Duchess pear, one of the tenderest of our pears, being carried home in splendid condition where proper attention is paid to the refrigerating chambers, yet consignment after consignment of pears which should keep twice as long arrive in an overripe or rotten condition, and the shipping companies repudiate any responsibility.

The same thing often applies to apples—varieties that will keep in the local cool stores for six months are practically ruined in a six weeks' voyage. I am aware that many of you are not kindly disposed to what are termed socialistic ideas, but is it any wonder that many growers look upon a Commonwealth line of steamers as the only possible relief from the present unsatisfactory conditions. Some better arrangement than the present is imperative, and the matter is now receiving the attention of the Government in several of the States. (Applause.)

TRAINING FARM FOR BOYS.

"During the past year I have given considerable attention to the question of a training farm for boys, with the object of giving city lads an opportunity of learning the practical work on the farm. At first it was intended to start at Turretfield, but on later consideration we have concluded that North Booborowie head station offered better facilities, as the buildings on the farm could be made available at little expense. Full particulars will be published shortly concerning the conditions of entrance, and I hope that we will be able to start actual work with the boys from January 1st next.

CONCLUSION.

"I do not know of anything else I should refer to in my opening speech to this Congress, and simply wish to repeat that I am very pleased to have the honor for the second time of declaring the Agricultural Bureau Congress open, and wish the members a most successful gathering. The Government fully appreciates the good work the Bureaus in the various centres have been doing, and recognise that they have been important factors in the agricultural progress of the State. We believe that the Bureaus will continue that good work to the advantage of their members and the State generally." (Applause.)

THE CHAIRMAN'S SPEECH.

The Chairman of the Advisory Board (Mr. A. M. Dawkins) said—

"I look upon the Agricultural Bureau as a very valuable institution. It is a means of distributing and gaining information. Farmers meeting together at the various Branches and discussing their experiences learn from one another. But the work of the Agricultural Bureau is more than the bringing of farmers together to exchange experiences; it is a means of bringing a body of men who are anxious to learn in touch and sympathy with those who are willing to teach.

"We have in the Agricultural Department a very fine body of experts, all of them intelligent practical men; but unless we have a sympathetic audience for those experts to lecture to—unless we have sympathy between the farmers and the experts—the experts can do very little. A friend of mine who lived in South Africa told me that when the Government there

appointed a number of agricultural experts, the Boer farmers said they were like the grasshoppers—a plague. It was not so in South Australia; but, nevertheless, I can remember when Professor Custance came to this State there were a good many sneers at a man like that coming to teach farmers who had been farming for over 40 years. But I think the farmers to-day are keen and alert and anxious to learn, because they have proved the value of the scientific information in regard to cultivation which the experts have given them.

PEDIGREED WHEATS.

"In 1884 the Government of the day were discussing the best means of getting over the damage done to our crops by red rust, and they were offering a remedy. I think it was Sir John (then Dr.) Cockburn who said that a remedy would have to come from the plant itself. It was just about that time that Mr. James Ward raised that fine wheat Ward's Prolific, and afterwards other farmers, Messrs. Steinwedel and Leake, and later on Mr. Richard Marshall, raised other rust-resisting wheats. Subsequently scientists took those wheats and improved them, with the result that to-day we have wheats which can practically laugh at red rust. And, what is more still, in the old days the farmers selected their wheats in a haphazard way, while to-day at Roseworthy College we have wheats being selected, crossbred, and improved in a thoroughly practical, scientific way, so that now we can get pedigreed wheats just as we can get pedigreed stock. Professor Perkins is doing work at Roseworthy College of a scientific practical kind, the value of which is perhaps not recognised as it should be.

A GREAT ADVANCE.

"Not only have we improved in regard to our wheats, but we have also improved in the methods of fertilising the land and fallowing, and that undoubtedly has helped us to overcome the trouble caused by red rust. I can remember when Professor Lowrie first advocated the use of phosphates, some farmers said that if they did so they would get a fine crop of red rust; but we have since found that the result of using superphosphate has shortened the danger period between hay harvest and harvest. I know that from practical experience. By the use of superphosphates the danger period is reduced, and the risk of red rust is consequently reduced in proportion. The methods of cultivation have also improved. I can remember when Professor Custance came here, he said the farmers were very slipshod in that respect. But we have learned the value of thorough cultivation, and I think this year has proved that. Although it has been a very dry year, the crops are looking very much better than we expected, and that is because the moisture from last year has been conserved by fallowing. With those other improvements there has also been a great advance in agricultural machinery, and that has been a great help to us. But while we have much

to be grateful for to the agricultural expert machinists and engineers, I think they have a great deal to thank the farmers of South Australia for, because the latter are always on the lookout for the best and most up-to-date machines. (Applause.) At one time we looked upon the soil as an inert mass. To-day we know that it is teeming with myriads of life, and that according to the manner in which it is worked those ferments help us or retard us.

KNOWLEDGE IS POWER.

"I do not, however, think we have learned all that there is to learn in that direction. I do not think farmers as a whole are cultivating the land as deep as they should. I have lately seen some experiments at Roseworthy College with deep-ploughing, and what crop do you think is looking the best there at the present time? It is that grown on land which was ploughed to a depth of 10in., and yet some farmers think if they plough 10in. their land will be ruined. The more scientific knowledge we acquire the more interesting does farming become. A man is better informed and better equipped for the work of farming if he understands something about the analysis of soils, the analysis of manures, something about plant and animal life. If a farmer possesses some knowledge of those things his work becomes much more interesting than if he knows nothing at all about them. You heard the Minister say that he was thinking about appointing more veterinary surgeons. I hope that it will not end in mere thinking. The more we understand about animals the better we are able to treat them properly. The same applies to plants. Unless you have studied botany and learned the life history of plants, you will fail to understand the similarity of plant life with animal life. How many farmers can tell what an insect is? But if a farmer listens to lectures on entomology he will know something about the life of insects. All knowledge is power, and some knowledge of the things I have mentioned will not only prove exceedingly beneficial to farmers, but make their life and work more enjoyable. (Applause.)

"I take it that the meeting together of farmers to discuss various subjects, and so improve each others minds, is one of the best things we can have. It gives our experts an opportunity to teach, and it gives us a chance to learn. It used to be said that any fool can be a farmer; but I know of no work which calls for more intelligence, scientific knowledge, and correct methods than does farming. (Applause.) In no other walk in life can a man get greater enjoyment, more freedom, or benefit his fellow-men more by the discoveries he may make. The most interesting and the freest life of all is the life led by the intelligent man on the land.

MORE TO LEARN.

"But it will not do for us to sit down and rest on what has been accomplished. There is a lot more to learn. We have only just touched the fringe. With more population will come closer settlement, and with closer settlement will come intense cultivation, and then farmers will have to keep

more and better stock and go in for the rotation of crops. The valuable work being done at Roseworthy by Professor Perkins, with the experimental plots and the rotation of crops, will prove a valuable lesson which we each should learn and apply to our own particular districts. Farmers cannot be altogether guided by what takes place in other districts, but in meeting together at this annual Congress we are helping one another, and he who distributes useful information not only benefits his fellow-man but helps himself as well, and makes his country better and life more enjoyable. I trust that you will have a useful and most successful Congress." (Applause.)

Votes of thanks to the Minister and the Chairman brought the session to a close.

TUESDAY, SEPTEMBER 12.

MORNING SESSION.

The Congress reassembled on Tuesday morning, when there was again a large attendance, which was presided over by Mr. A. M. Dawkins (Chairman of the Advisory Board).

HOW TO IMPROVE THE WORK OF THE AGRICULTURAL BUREAU.

Mr. P. H. Knappstein, Hon. Secretary of the Clare Branch, read the following paper on "How to Improve and Extend the Work of the Agricultural Bureau":—

"Very noticeable to one who reads the reports of various Bureau meetings in the *Journal of Agriculture* is the small attendance of members and the absence of discussion on some of the most practical and instructive papers given at these meetings. Seeing that the Bureau is a benefit society for the producers, and the only institution that the producers of South Australia have in which they may debate and exchange ideas on the knotty problems pertaining to their calling, one is led to ask why this apparent lack of interest exists in some Branches. My opinion is that the small attendances and lack of discussion are caused through not making our Bureau meetings interesting enough to all members. The Secretaries are the men who can overcome this difficulty to a certain extent, and improve their respective Branches. I also think that the Presidents can help a lot in this matter by strictly adhering to the rules of debate, and not allowing members when discussing any particular question to drift into a lot of desultory talk that will neither solve the question before the meeting nor be of use to anyone.

"In the successful working of a Branch the Secretary must try to see that all the members attend regularly. If he has any members who are not regular in their attendance and who take little or no interest in the Bureau work, he should take steps at the end of the year to have those members' names removed from the roll. It is far better to have a small number of useful

members than to have a large roll with a number of indifferent members. Of course some members find it difficult to attend regularly, although perhaps they may take a great interest in Bureau work, and supply much useful information when they do attend. They may not be able to attend regularly on account of long distances from the Bureau meeting-room, or on account of pressure of business. I think such men should be excused from having to retire at the end of the Bureau year.

"I am not in favor of the rule that the third lowest on the roll of attendance should retire at the end of every year. Those that are included in the third lowest are certainly eligible for re-election; but still the Advisory Board does not always approve the re-election of a member who may be very low down in the list, although he may be a most useful man to his Branch. As the Advisory Board does not know who are the useful and who are the indifferent members in that third lowest, they are quite justified in not approving of their continued membership, and thus preventing our rolls from becoming crowded with a number of useless members. I think, however, that the Branches themselves should have the right to regulate their rolls at the end of the year, and strike off the useless members' names, as they know best which members take an interest in the Bureau. I feel sure that if that power were granted to us we would not abuse it and allow our rolls to become filled with indifferent members.

"Secretaries must be energetic men, and see that at least one paper will be read at each meeting. I suggest that the Secretary make out a list of his members' names in alphabetical order, and try to arrange the programme of subjects in such a way that no two members' names who have the same calling follow one another. Let the Secretary then ask the member whose name comes first on the list to write a paper for the next meeting, giving him at least a month's notice, so that he can thoroughly prepare it; and so on right down the list. When the members know that the Secretary has such a list prepared they will realise that it is their duty to their fellow-members to read a paper when their turn comes, because if they do not they cannot expect to get the benefit of other members' ideas. The Secretary will not then have much trouble to make arrangements for his meetings. Some members may say that they are not capable of writing a paper; but I think it is nonsense for any producer who is a member to say that. Everyone of us is quite capable of writing about something. We should never think when writing a paper that all in it is perfect in the way of ideas, and that it will be beyond discussion. On the other hand, if our ideas are not quite practical, we shall get the benefit of all the other members' knowledge on the point in question, and so be the gainers every time. The Secretary ought to know each member's favorite hobby or work, so that when he asks for a paper, and that member asks what subject he could write about, he would be able to suggest one straight away, and so overcome that difficulty.

" We do not want silent members in our Bureau ; that is, members who come to the meeting and sit right through without opening their mouths to give their ideas in a discussion, but who will outside with one or two others scoff at some points in a paper and say they are wrong and then give their views. We want those members to give their ideas in at the meeting, and not outside. Of course there are some bashful men who do not like to express their views in public, especially our younger members ; and I think that our Presidents should encourage them to speak by calling on them personally to give their views, and after they have once ' broken the ice ' we shall find that they will be as ready as other and older members to join in a discussion. When once they do that they will take a greater interest in the Bureau work.

" It is a capital idea for each Branch to have a question box put in some public place where others besides members of the Bureau may place questions. This box to be opened at every meeting and the questions that have been put in it read out for the members to answer, if possible. If it is not possible for the members to answer any particular question, it should be forwarded on to the Department of Agriculture for an expert to answer through the ' Inquiry Column ' in the *Journal of Agriculture*. In my opinion these questions received through the question box help to make the meetings more interesting, as most questions cause a discussion, in which a lot of useful information is gained that might never be brought out in a paper.

" I am also in favor of members tabling for inspection anything interesting which they or their neighbors may have, especially in the case of any new weeds they may have discovered. If the other members do not know the weed, it may be sent to the Department for identification. I feel sure that if we as members all did this, we could be the means of stamping out many noxious weeds before they became too strongly established in a district.

" Homestead meetings I think are neglected by most of our Branches. To my mind these are very interesting. I am not in favor, however, of neglecting our ordinary monthly meeting and the reading of a paper for them ; but of course the two may be combined. It is always advisable to make homestead meetings an extra Bureau meeting, if possible, as a lot of useful knowledge is gained at these meetings both by the host and his guests, irrespective of whether it is a large holding or a small one.

" Another good idea which I would like to advise Secretaries of Branches to take up is to arrange a pruning match or a ploughing match in the various districts. These matches help to give members more interest in the Bureau, and provide a means of securing new members. Much expense need not be incurred in running these matches, and, providing that they are well arranged, the entrance fees from the competitors would defray the cost of the prizes. If it is not convenient to arrange one of the above-mentioned matches, a very good idea in my opinion would be to give a prize amongst your members to the one who has the best worked fallow, or who has the best graded wheat.

Either of the above suggestions—whether a pruning or a ploughing match, best worked fallow, or best graded wheat—would be productive of a lot of good in any district, and would show producers that the Bureau is a society worth joining.

“I am also in favor of the Government experts giving lectures under the auspices of the Agricultural Bureau in places where there are Branches. This helps to extend and improve the work done. Another matter which I would like to suggest is for Branches that are situated not a very great distance apart to hold small conferences amongst themselves. Members from one Branch can interchange their ideas with those of other Branches, and in the discussions many useful and practical points would be gained for the good of all.”

ANOTHER VIEW.

Mr. F. Jacobs (Miltalie) read the following paper contributed by Mr. W. E. Hfer (Hon. Secretary of the Miltalie Branch) on the same subject:—

“If we are to continue the good work which the Agricultural Bureau has undoubtedly accomplished, every member must keep in mind the fact that he is part of a great organisation, and each must endeavor to make the meetings of interest and of value.

“Some members have to drive long distances to attend the meetings, and unless these men are kept interested and enthusiastic they will soon cease to be present with that regularity which is so necessary to keep the Branch together and to secure new members.

“I would suggest one or two practices which may increase the interest of a Branch. I have noticed that members who take enough interest to attend regularly and punctually are those who are usually willing to help by reading papers, and by taking part in discussions upon different subjects that are brought forward from time to time.

“Papers read and discussed provide a means of bringing forward many young members, who thereby become accustomed to speaking before others, and learn to take a certain amount of criticism in a gentlemanly and sensible manner when their views on a given subject do not agree with those of others present.

“I would also suggest that Branches sometimes have a complete change of programme. This, I think, would greatly increase the interest. Take, for example, a night for a social gathering, when songs and recitations could be contributed by the members, not omitting time for reading the minutes of previous meeting and the transaction of necessary formal business. The meeting might also take the form of a lantern lecture, where there was a suitable place available, the lecture and pictures shown to deal with some subject in connection with agriculture, such as horses, cattle, or poultry-breeding. I have not heard of any meeting of this kind on the West Coast, but I think it well worth a trial where possible.

"A Conference of a few Branches in a district has been found successful.

"Homestead meetings have nearly always proved a great success, but as they are not always easy for those who are kind enough to go to the trouble and necessary expense to provide for such a large number as generally is present, I would not advise that any Branch should hold them more often than once a year.

"I have heard it said by non-members that they cannot see the value of the Bureau, because, in their opinion, Mr. So-and-So, a member, has asked a silly question, or read something in a paper that they consider foolish. I should ask all such men as these why they do not give us the benefit of their experience and knowledge by joining the nearest Branch Bureau. I would tell them that they may thereby save from loss of time and money those who are about to test some practice which they have proved to be profitless, or some new implement which they have proved to be unsuitable to the district.

"It is well worth any farmer's time to down tools occasionally in order that he may find out what other men know, and few farmers will claim that they know too much. There is plenty of room for wider knowledge, both in the treatment of soils and in the breeding of the right class of stock, and this is one of the main reasons for the existence of the Agricultural Bureau as an institution by means of which to teach others and learn something themselves in exchange. Many a farmer has learned at the Bureau meeting something which has been the means of his avoiding a practice that someone else has, by experience, proved to be profitless. If for no other reason than this, it is worth any farmer's time to attend the meetings.

"The Chairman should keep proper order, and should require members to stand and address the chair, only speaking once upon any one subject, unless in a reply or in making plain anything that is not quite understood. In every meeting of this kind there are those who are full of useful information, while others are rather shy. The latter should be given a chance to ask a question and express their views.

"In regard to the rule that if members miss three meetings in succession their names should be crossed off the roll, I would suggest that if members whose work takes them out of the district for a time would only take the trouble to inform the Hon. Secretary by letter before the time of meeting those present would know better how to deal with them, and thus avoid losing as members those who are of value to the Branch when they are able to attend.

"At the same time I think it worth while to arrange business so that members can attend if at all possible. I fully believe it is better to have a small membership and a good attendance than a large membership and a poor average attendance.

"In conclusion, I would like to say that each Hon. Secretary should be alive to the duties with which he is entrusted, and do all in his power to keep up

the interest in his Branch, and especially remembering that his own Branch is a part of the larger institution—the South Australian Agricultural Bureau.”

A VIGOROUS DISCUSSION.

Mr. C. Ricks (Cherry Gardens)—“ I wish to congratulate the writers of both papers on the very able manner they have brought the subject before Congress. Cherry Gardens, which is one of the oldest Branches, is a live Branch. Mr. Knappstein said he was not in favor of the rule that the third lowest on the roll of attendance should retire every year. That question was a sore point years ago when the Branches had power to strike members off for non-attendance. In those days the Secretary often got into hot water for carrying out the rule relating to striking members off the roll, and so far as my Branch is concerned we were very pleased when it was decided that the Advisory Board should take the responsibility of striking members off for non-attendance. In regard to the system of keeping up interest in the work of the Bureau, at Cherry Gardens we have a committee which every six months prepares a programme and allots a subject to each member. The agenda paper of the meetings is sent to each member, so that he can keep it in his home and refer to it to see what subject will be discussed at each meeting. Then at the first meeting in December in each year we have a banquet—though we do not have any intoxicating liquors—to which members can bring their wives or sweethearts and meet together in a social way.”

Mr. L. Wright (Naracoorte)—“ Our Branch has adopted the principle that each member in turn shall read a paper, and it has proved a great success.”

Mr. J. Tylor (Wilkawatt)—“ I do not agree with Mr. Knappstein that the Branches themselves should have the right to regulate the rolls. I think the present practice a good one. In regard to the reading of papers I have found it very useful to find out the hobbies of members and to get them to read papers on those subjects. It does not follow, however, that because a man cannot read a paper he is not a useful member.”

Mr. A. Bothwell (Davenport)—“ I agree with the present rule as to the retirement of members for non-attendance. I think the idea of officers of the department giving lantern lectures a very good one.”

Mr. W. Mitchell (Geranium)—“ My Branch has adopted all the suggestions made by Mr. Knappstein. We have had a field trial for two years and they proved a great success, and we intend to make it an annual feature. I contend that a field trial is better than a show, because, though it is all very well to see implements nicely painted up at a show, it is much more useful to see them in the field at work. (Applause.) We introduced the question box system some time ago, and it has led to very valuable discussions.”

Mr. W. Gum (Amyton)—“ Our system is to prepare a programme for the whole of the year, and therefore those who have to write the papers have plenty of time to prepare them. Members of a Bureau should be live members.”

Mr. F. Masters (Bute)—“My experience is that if the third lowest on the roll of attendance have to retire we will lose some of our best members. In regard to field trials, we are working in conjunction with other Branches in our district, and I think it is safe to say that we run perhaps the most successful field trial in South Australia. As to silent members, those who speak most are not always the most valuable members. It is often found that a silent member who comes to the meetings and listens and afterwards demonstrates what he learns is a more valuable member than those most voluble.” (Applause).

Mr. Coleman (Saddleworth)—“I agree with Mr. Knappstein as to the value of homestead meetings.”

Mr. D. W. Tucker (Kalangadoo)—“I think homestead meetings one of the best things we can have. My father and myself invited the members of our Branch to inspect our farm, and the return we got more than doubled any little trouble we may have been put to. We were able, through the reports of the inspection which appeared in the *Journal of Agriculture*, to sell all the produce of the farm and got from 2d. to 3d. per bushel more. Not only was that so, but we had a very pleasant day and gained from the experiences of the other members, and I believe they gained from ours.” (Applause.)

Mr. J. P. McDougall (Morchard)—“Homestead meetings so far as my Branch is concerned are the most useful meetings we have held. A man cannot go to another man's place and inspect his farm without seeing something there better than he has got himself.”

Mr. A. Phelps (Clarendon)—“I agree as to the value of homestead meetings. There is no reason why Bureaus should miss their ordinary meetings through having homestead meetings, because they can spend the afternoon inspecting the crops and hold their meetings at the homestead in the evening. In respect to attendance I think the present rule relieves the secretary of a great responsibility. It was said in one of the papers that the Advisory Board does not always reinstate members when the list is sent in, but perhaps that is the fault of the Secretary. I think three months' notice should be given of the reading of a paper, so that members may know what is coming up for discussion.”

Mr. W. Munday (Port Pirie)—“At one Branch a programme for the meetings is drawn up at the first meeting of the year and papers are allotted certain members. We have two homestead meetings each year, and find them most useful and instructive. They do not interfere with our monthly meetings.”

Mr. A. J. Davis (Gawler River)—“Gawler River is a very live Branch, and we have adopted a system of getting out a programme for the whole of the year. The members chosen are responsible for the papers to be read, and are given the choice of the subject. Most of the papers read are on agricultural

subjects, and therefore it is not necessary that members should know what the subject is before they can discuss it."

Mr. G. G. Nicholls (Secretary of the Advisory Board)—"I think the writers of the papers are to be congratulated on having called forth such an interesting discussion. The Chairman has asked me to explain in regard to the rule as to the retirement of members who are third lowest on the roll of attendance. Let me assure you that the Advisory Board is always guided by the wishes of the Branch in question. The secretary has only to say that any man is a useful member, and if he will undertake to be more regular in his attendance in future, his name is reinstated. I am glad that the necessity for drawing up a programme of papers to be read has been emphasized in the discussion this morning. I read through all the reports of meetings of the Branches, and can assure you that the best meetings are held by Branches which follow that practice. Some members do not read the *Journal* as they should; this is proved by the number of questions received which have been answered perhaps in the previous issue. The value of the *Journal* to the individual and to the Bureau Branches is greatly increased when it is indexed and bound: It is then of great use for reference purposes, whether for remedies for stock troubles or matters concerning general cultivation. But there is difficulty in country districts in getting the *Journals* bound. To overcome this the Director has approved of my suggestion to set aside a copy each month and then bind, with the index, each volume for any Branches whose members are willing to find the necessary five or six shillings to cover the cost of binding. The bound volumes could then be kept at the meeting places for reference at any time." (Applause.)

Professor Lowrie (Director of Agriculture)—"I would like to add a word or two to this discussion from the point of view of the man who does not see the advantages of the Agricultural Bureau. Someone has put it forward as if a man who spends his time at the meetings of the Bureau does so at some loss to himself. I take it that there is no man in South Australia, however well-informed he may be in matters pertaining to agriculture, who would not benefit by carefully reading the reports which appear in the *Journal of Agriculture* of the different meetings of the Bureau. (Applause.) Any man is inevitably bound to find something in those reports which will make his knowledge, no matter how great it may be, still more complete, and which will react to his own personal advantage as a farmer. In my opinion, if I may digress for a moment, the Agricultural Bureau in South Australia, organised and working as it is, forms the very highest monument that can be offered to the memory of the late Mr. Moloney, who was so instrumental in establishing it. (Applause.) The institution is so democratic. The wealthy farmer and the poor farmer can find a seat at its meetings side by side to their mutual benefit. Some men are opposed to the Bureau because they look at it from a narrow vision. They think that farmers come into competition with one

another, and that it is well therefore that they should keep their ideas and methods to themselves. It would be well for them to get rid of that idea. The products of the farm go out of the State, and therefore the production from the land in the way of high quality produce does not affect the market for the most feeble, but is really an advantage to him because it directs the eyes of the world's markets to what the State can produce. There is no competition in farming. The first-class breeder of stock may be reluctant to give to others his methods, but on the other hand one of the members has referred to the advantage which he gained from bringing the members of his local Bureau to inspect his farm, and the stockbreeder would reap advantage in the same way. Taking it all round it is not a matter of duty to attend the Bureau meetings, it is a matter of self-interest. The Agricultural Bureau is about the only form of co-operation amongst farmers which has found an extensive footing, and anyone who looks at the movements now taking place must know that if farmers are going to get the full returns for their efforts they must move in the direction of co-operation. The producers are many, but the men who buy what they produce are few, and the farmers have little control of the disposal of their produce; but if they came as a co-operative force they would have some influence. The Agricultural Bureau, then, is an institution by which producers can work co-operatively, and therefore from the point of view of self-interest should be encouraged, supported, and helped in every possible way by the farmers. (Applause). Speaking in regard to the relation of the Bureau to the Department of Agriculture, I may say that where I have been working the last few years I felt the want of an institution such as the Bureau, which brings the department into direct relation with farmers in every portion of the State. In New Zealand the farmers have what are called Farmers' Unions, and they are partly agricultural and a good deal political; but there is no common ground there for the officers of the department and the men engaged in active work to meet together and discuss problems such as the Bureau affords in South Australia. As an officer of the department concerned in helping forward the agricultural industry I hope the Bureau will increase in strength, vigor, and effectiveness." (Applause.)

Mr. Knappstein (Clare) in replying said—"I wish to point out that if the power of striking the names of members off the roll is given to the Branches they will be struck off by resolution and not by the secretary of the Branch. I move—That the Branches should have the power to regulate their rolls at the end of every Bureau year, and that the Advisory Board have nothing to do with the matter."

Mr. J. P. Pontifex (Paskeville) seconded the resolution, which was lost by a large majority.

ROLLING GROWING CROPS.

Mr. R. S. Goldney (Balaklava) read the following paper on "Rolling Growing Crops" :—.

"This subject up to the present has not received much attention in the discussions which take place among the various Branches of the Agricultural Bureau in South Australia, and yet I believe it is one which is worthy of our careful attention.

"I will therefore, as briefly as possible, give the reasons why I consider the rolling of growing crops to be beneficial, and will deal first with crops which it is intended shall be cut for hay.

"Here, of course, the results are obvious. All clods, small or otherwise, are broken. Small stone and pieces of wood are pressed into the ground, making it possible to cut the hay crop lower than would otherwise be possible, thereby gaining a considerable quantity of hay, especially if the area to be cut is large and the crop heavy. There is also less danger of breakages, which generally mean loss of time and money, and the machines will run lighter on land which is in the condition I have just described. This latter consideration—the lighter running of machines—would also apply to the harvesting of the grain crops.

"To consider another phase of the question on the lighter classes of land—not sandy, but a kind of white marly soil—the most beneficial results of rolling cereal crops, especially wheat, are to be seen. Light land, if worked and drilled in when fairly wet, in many instances remains in what may be termed a spongy condition, which seems favorable to the operations of grubs and worms of various kinds. If land such as this be rolled with a fairly heavy roller when the plants have reached a suitable stage of growth, say about eight or nine weeks old, many of these destructive forms of life will be destroyed, and the ground consolidated, and the crop be rendered less liable to 'take-all' later on in the season.

"If there should be violent winds or rain storms just prior to or during harvesting operations, it will be found that crops on land which has been rolled will stand up much better than those upon land not so treated. The process of harvesting is therefore much easier and more satisfactory, and a saving of grain is effected whether the crop is taken off with the combined harvester or the stripper. It must be remembered, however, that in dealing with this, as with many other subjects, no hard and fast rules can be laid down, as local conditions have to be taken into account. Practices which may suit the crops of one farmer may not suit another.

"There are difficulties in the way of carrying out this work, such as wet weather at the time when the rolling should be done. Another is that the farmer is generally busy fallowing at this time, and does not like to leave off

to do work which does not seem absolutely necessary ; yet I believe it would pay farmers to roll more of their cereal crops than is generally done at the present time."

THE DISCUSSION.

Mr. W. Gum (Amyton)—" I do not approve of rolling, because it makes the ground set hard and the water runs off instead of going into the soil. I think harrowing does more to conserve the moisture than rolling, and by harrowing a lot of weeds are pulled up. If a sharp tine is used it will not pull up much of the crop."

Mr. Rowe (Northfield)—" I had a heavy crop last year and did not roll it. At harvest time a good deal of it went down, but that of a neighboring farmer, which was rolled, stood erect. I think if I had rolled mine it would have checked the growth and made it hardier. The wheat was Huguenot."

A Delegate—" Would a crop be less liable to takeall if it is rolled? I think takeall is on the increase, and that rolling is advisable where practicable."

Mr. McDougall (Morchard)—" The great disadvantage of rolling is that it leaves the surface too smooth."

Mr. A. Crisp (Amyton)—" I think whether it is better to roll or harrow crops depends a great deal on the district and the nature of the soil. In sandy soil rolling is best ; but where the land is inclined to be heavy I strongly favor harrowing."

Professor Lowrie—" Regarding the question about takeall, I think the position is that in light land, so far as the health of the plant is improved by the firming of the soil so much more is it likely to contend with takeall ; but takeall is due to infection of the land, and the rolling cannot be effective as a cure. My experience when working here was that takeall was worst in the lightest land, and therefore one would reason out that if the land can be made firmer you get a more healthy vigorous plant that might contend better with the fungus ; otherwise rolling cannot be described as a preventive of takeall. On the general question of rolling or harrowing my opinion is that for the South Australian farmer harrowing is more advantageous than rolling. There are occasions when it may be desirable to roll if you can get a roller heavy enough. The roller undoubtedly is an instrument which tends to lessen the amount of conserved moisture, and if you do roll at all harrow afterwards. Harrowing goes a long way to firm the soil if it is properly done. My own experience is in favor of a very thorough harrowing, but I have never found much benefit follow rolling. Rolling a crop intended for hay is, of course, a different question. The best time to harrow is when the plants are between 4in. and 6in. high. The tines of the harrow should be sharp and narrow. It is best to harrow across the drills, as it breaks the ground better."

WINDBREAKS.

The following paper on "Windbreaks" was contributed by Mr. P. J. Curnow (Wirrabara):—

"The fact that horses and cows that have no better shelter will stand all night under a few trees in a paddock is evidence enough that they appreciate even the scant shelter which such trees afford, and would undoubtedly avail themselves of the protection against the elements which large blocks of trees in the centre of paddocks or along the fences would provide.

"To provide good shelter, trees should be planted sufficiently densely to break the cold winds. While one row of trees will do this to some extent; three or four rows would be better. From an economic point of view the writer would suggest that the best plan would be to plant across the corners of the paddocks. In this way quite a dense block could be provided, and little interference with farming operations would result.

"Although many stockowners may not agree with the writer in his plea for better protection for farm animals, they must surely admit that protection against the elements is most necessary for their homes. With few exceptions we see throughout the North otherwise comfortable homes quite exposed to every wind that blows. Sometimes a single row of trees will be seen around a house, but this is of little value as a protection against a northern brickfielder in summer or a piercing wind of winter. For providing protection of this character the homestead should be quite surrounded on every side by at least four rows of suitable trees.

"The soil and locality will decide what trees to plant. In a very dry northern district I should advise the planting of pepper trees. They are rapid growers, and stock will not eat them. If a pepper tree will not grow, given good attention, it is a waste of time to plant any other variety of tree at that place, for it is without exception the hardiest tree in common cultivation. In a more suitable climate, where the rainfall is from 12in. to 15in., the sugar gum and some varieties of pines do well. The sugar gum is a hardy tree once started, but in some localities, although it will continue to grow, it cannot be said to thrive as it should. When the soil is good and rain sufficient, given careful attention, it grows amazingly, and the writer has known instances in which this variety has grown up to 18ft. in three years. Among the more common pines *Pinus insignis*, *P. maritima*, and *P. halepensis* can be recommended for ordinary districts with a good rainfall, and do well on sandy or loamy soil with a good retentive clay bottom.

"The common Stone pine is very hardy, and will do well on limestone land. For dry districts the common erect cypress does well and makes a good windbreak when planted about 4ft. apart in the row. Other trees could be mentioned, such as the tamarisk, poplar, carob, &c., but those given are certainly the best of our common trees.

"Probably in no part of the world does the State do as much as our own for the encouragement of tree-planting, and in this good work quite a number of public bodies set a good example by planting extensively in our country towns and recreation grounds. The State provides trees freely. How, then, can property-owners find an excuse for not beautifying their homes ?

"*Preparation of Land.*—After the site for planting has been selected, plough the land deeply and thoroughly. Many failures in tree-planting can be traced to poor preparation of the soil. If only a single row of trees is to be put in, plough the strip at least 10ft. wide. If a block be decided upon, plough at least 10ft. beyond the last row.

"In the single row proposition if gums are to be put in, dig the holes 10ft. apart. If pines are decided upon, a little closer will do. When a block is to be planted in a corner or around a homestead, all the varieties mentioned could be planted from 12ft. to 15ft. apart. Dig holes, say, 18in. by 18in., and keep the subsoil in the bottom of the holes. If the weather is dry, treat each tree to a can of water, and so give it a chance to make an immediate recovery. Plant pines, cypress trees, and other hardy trees early in winter. June is not too early. More trees are lost in this State through late planting than from almost any other cause. Gums and pepper trees must wait until frosts are gone, but should go in as early as possible.

"The after cultivation now needs attention. As the dry weather approaches hoe the young trees, and keep stirred throughout the season. If a dry spell comes in, give a watering when needed, and again stir the surface before the soil cracks. If these slight instructions be followed, success must crown the planter's efforts. It is astonishing how young trees respond to good treatment. The second year again carefully plough the planted land and dig around the trees. Later in season give a scarifying. This is not usually done, but I am convinced that it is possible to make forest trees grow as much in two seasons under good cultivation as they will grow in four if neglected.

"For the benefit of those who may contemplate planting, the following plan for a homestead would be suitable :—

"Nearer the house plant a row of Remarkable pines (*P. insignis*); 20ft. out plant a row of sugar gums; and another 20ft. or even 15ft. plant a second row of gums; and 15ft. to 20ft. from these a row of pepper trees. Owing to their dense foliage they will materially assist in breaking the wind. With a plantation of this character around a home an excellent protection will be provided, and the value of the property will be considerably enhanced."

VARIOUS OPINIONS.

Mr. S. Eyre (Georgetown)—"I think our thanks are due to Mr. Curnow for his paper, but I do not agree with the statement that the best plan is to plant trees in the corner of the paddock to provide windbreaks. My idea would

be to plant a quarter or a half an acre in the centre, so that the stock can get protection no matter from what direction the wind is blowing."

Mr. W. Munday (Port Pirie)—"I disagree with the statement that stock will not eat pepper trees. My experience is that they are fond of pepper trees. I agree that farmers should provide shelter for their stock. Many farmers have been so anxious to grow all the wheat possible that they have practically destroyed all the natural shelter, and now find it very hard to get trees to grow."

Mr. S. O. Smith (Angaston)—"If pepper trees will not grow I think it would be a waste of time to plant any other trees. Tagosaste will do without cultivation even where better trees will not grow. It makes a dense shade and provides good feed for stock. Trees should be given water when planted, no matter whether the weather is wet or dry, so that the soil will settle round the roots. A motion was passed by the Angaston Branch requesting that the Minister should make it compulsory for every new settler to leave a shelter break round his holding from a chain to two chains wide, and if such a resolution as that was passed at this Congress it would carry great weight."

Mr. H. G. Hawkins (Port Pirie)—"I would like to impress upon those who desire to plant trees the advantage of looking well ahead. If they follow the land well they will find that the trees will thrive better. Sugar gums and pepper trees grow well in my district, but the pepper trees have to be protected, because horses have a great relish for them."

Mr. C. Ricks (Cherry Gardens)—"We should grow trees to provide timber for our own use in building and also for making boxes for the export of various produce. I have gone in for *Pinus insignis*, and I am satisfied that I will have a better return from the land on which they are planted without working it than I will get from the adjoining land which I work."

Mr. W. Mitchell (Geranium)—"At Pinnaroo the Government has laid out roads three chains wide, one chain only being for the road and a chain on either side being left for windbreaks. Those windbreaks harbored vermin, and some people think they should be removed, but the district council considers that the windbreaks are more of a blessing than a curse."

Professor Perkins (Principal of the Roseworthy Agricultural College)—"From time to time I have had a good deal to do with the planting of trees at Roseworthy. My experience is that in dry districts such as ours, while cypress trees do well for five or six years, after that time they die out very quickly. In regard to the pepper tree I have noticed that on the limestone country it very rarely lives for more than 15 or 20 years. Moreover, I can assure Mr. Curnow that stock are very fond of it. One aspect of the question which should be considered is the planting of trees on roads. I think that in this respect the roads are disgraceful in some places. One may walk for miles along some of the roads in this State on a hot summer's day and find it impossible to get any shelter. In other countries trees are planted all along the streets and roads. I think

the district councils should themselves plant trees along the roads, or compel the adjoining owners to do so. Some years ago I wanted to plant trees along the road from the College to Gawler, a distance of about eight miles, but I found that the owners objected to the trees being placed near their fences because some few feet of their land might have been affected. One aspect of the question which appeals to me strongly is that relating to the supply of firewood. I think that unless steps are taken to make adequate provision for future requirements in this connection our children or our children's children will be compelled to use coal instead of wood as fuel. I will be sorry for them when that time arrives. (Hear, hear.) The firewood question occupies a prominent position at Roseworthy, where we burn 150 tons a year. Reckoned at (say) £1 a ton, that means a considerable sum. I am now engaged on an experiment by which I hope to ascertain how many years it will take to grow sufficient timber to meet the needs of the College, and the area essential to render it unnecessary to go in for additional planting or re-planting. Assuming that it will be possible to obtain 150 tons of wood from five acres at the end of 20 years, my idea is to plant 100 acres, and cut five acres each year. Thus by the time the last section is cut the timber on the first five acres will have grown sufficiently to enable the round of cutting to be started again. Those figures, of course, are merely by way of illustration. I am perfectly satisfied, however, that at the present price it would pay to grow timber for firewood; and I think the different public bodies, such as the corporations and district councils, should interest themselves in the matter. (Applause.) With reference to planting roadways, I have always tried to plant both sides of the road, but Professor Lowrie has said that if that is done it may be a difficult matter to keep the road in repair, because the dripping from the trees might prevent the road becoming sufficiently dry. As to that, however, I think the fault lies with the district councils, because they will make flat roads, with the result that the water will not run off."

Mr. W. Slee (Wilmington)—"I agree that the land should be well prepared before trees are planted. Four years ago, after fallowing the land well, I planted 1,000 red gum trees, and of those hundreds are to-day from 20ft. to 30ft. high."

Mr. Curnow (Wirrabara) in replying said—"I think stock must be pretty hard up when they eat pepper trees. (Laughter.) At Laura, which is one of the best planted towns in the State, I have never known stock to eat pepper trees. However, if they do, it is only necessary to fence off the trees when they are young. I agree that the better plan is to plant trees in the centre of the paddocks, but a great many farmers object to that, because they say if they do so they will lose too much land. The Government have been distributing trees gratis for over 20 years, and during that time must have distributed millions, but to-day most of them are dead. I say emphatically

that that is principally due to the trees not having received proper attention after they were planted. In regard to the commercial aspect of the question, I might state that at the Wirrabara Forest 214 fruit cases were cut from one tree and sold at 1s. each. For commercial purposes plant *Pinus insignis*, but do not plant them nearer than 16ft. to each other.

The Chairman—"I have noticed cattle eat pepper trees at this time of the year, when they have a superabundance of feed."

Afternoon Session.

Mr. G. R. Laffer (a member of the Advisory Board of Agriculture) presided.

BERSEEM, OR EGYPTIAN CLOVER.

Professor A. J. Perkins, Principal of the Roseworthy Agricultural College, read the following paper on "Berseem, or Egyptian Clover":—

"When I was asked to read a paper before Congress I had at first some difficulty in fixing on a subject which would prove of general interest, and concerning which I might hope to say something that had the merit of novelty. Last July I brought the question of Berseem, or Egyptian clover, under the notice of the Advisory Board of Agriculture; and since then I have been inundated with inquiries on the subject, coupled with requests for seeds. I should add that interest in the subject does not appear to be confined to South Australia; indeed, on the whole, inquiries from the other States have been more numerous.

"Now, I have the conviction that, in certain localities and under certain conditions, Egyptian clover is going to prove a most useful addition to our usual forage plants. I should feel sorry, however, to find it handicapped from the very outset of its career in our midst by exaggerated estimates of its qualities and adaptability. Let it be clearly understood therefore that I do not for a moment anticipate that this clover is going to find itself at home in every district of the State. It is as well to recollect that it comes from Egypt—a land where conditions are such that not a thing can be grown without the aid of artificial irrigation; and Berseem cannot therefore be classed with those drought-resistant plants for which we are always on the lookout. Whilst I was in Egypt last year I was much struck with its extreme luxuriance of growth, and the thought naturally occurred to me that on the Murray swamp land it might prove an extremely useful winter forage plant, but beyond that I did not look. With the present season's experience of this clover at Roseworthy, however, I am now inclined to claim for it a wider sphere of usefulness. It is not difficult to foresee that it is not likely to meet the requirements of all and sundry, and, with a view to taking off

the edge of the possible disappointment of some, I propose to-day summarising all I know about this clover, and what I believe can be done with it in South Australia. I might state here that I have already drawn attention to the position it occupies in Egyptian agriculture in a report that was published in the May, 1910, number of the *Journal of Agriculture*.

DESCRIPTIVE.

"In the first place, *Trifolium Alexandrinum*, as it is known to botanists, is a strong-growing annual, with succulent, fleshy stems and broad, soft leaves, readily accepted by live stock of all kinds in any stage of development. The flowers, between cream and pale yellow in color, are clustered together in a fairly compact cylindrical spike; the ripe head is the usual rounded clover head, coming readily to pieces after maturity. In its first growth Berseem appears to send up a single stem, carrying several leaves, but no lateral branches. At the time of the first cut, however, when growth is from 15in. to 16in. high, there appear at the base of this original stem three or four side shoots, which after the first cut shoot upwards and replace the first stem. It follows, therefore, that the second cut, given satisfactory conditions of growth, must prove both thicker, denser, and on the whole heavier than the first cut; indeed, up to the present this appears to be our experience at Roseworthy this season.

CLIMATIC INFLUENCES.

"In those countries in which summer heat is great Egyptian clover is a characteristically winter-growing plant, running to seed on the first approach of hot weather much in the same way as a winter-sown turnip crop with us. It is by far the most important winter crop of Lower Egypt and it is mainly as a winter crop that it can hope to find a place in our midst. I have been asked by correspondents whether Egyptian clover will resist frosts. With my limited experience of it this is, of course, a difficult question to answer definitely. This much, however, may be said on this point. In Lower Egypt frosts appear to be quite exceptional; at the same time, I believe that the complete absence of rain, the clearness of the winter atmosphere, and general absence of cloud must frequently have the effect of reducing early morning temperature to the neighborhood of the frost line. On the other hand, this season Berseem had to run the gauntlet at Roseworthy of a tolerably cold winter; nor did it hang out any signs of distress. It is difficult for me to indicate definitely the number and intensity of the frosts that may have affected our Berseem crop; and this because our meteorological observations are taken on a hill fully three-quarters of a mile away from the low land in which the Berseem had been sown. I am of opinion that the Berseem crop came under the ban of fully half a dozen more frosts than we have any record of, and that the general intensity of the frosts has always been greater in the immediate neighborhood of the Berseem crop than those

recorded on the Observatory Hill. I append below the frosts recorded by us this winter, all of which affected the Berseem, although probably with greater intensity :—

	Deg. F.		Deg. F.
June 29th	32	August 20th	31.8
July 5th	31.5	“ 22nd	30.3
“ 21st	30	“ 24th	31.9
“ 23rd	29	“ 25th	31.8
“ 24th	29.5	“ 26th	31.9
“ 25th	30		

“ Some of these frosts were sufficiently intense to turn up the Cape marigolds, or dandelions, although they were altogether without ill effect on the Berseem.

“ In the matter of the rainfall requirements of Berseem we cannot go to Egypt for information, for the rain that falls in this country is a wholly negligible quantity; hence in Egypt winter-sown Berseem is as much dependent on artificial irrigation as summer-sown cotton and maize. Here land intended for Berseem is flooded immediately before seeding operations; and the crop itself is irrigated once or twice between each cut. At Roseworthy this season Berseem made very fine growth in a winter in which the rainfall was practically 4in. below the normal average. It is true, however, that in order to secure early germination we were compelled to irrigate the land sown to Berseem with overhead sprinklers early in April; had we been favored with early autumn rains even this might have been avoided. The first and second cut received no further irrigation; we propose irrigating the third cut with a view to securing the seed.

“ The seed was sown on April 5th; the first cut was started on June 16th, and completed on August 1st. The rain recorded over this period was as follows :—

April	0.33 inches
May	1.79 “
June	2.33 “
July	1.55 “

Total 6.00 inches

“ Hence, a total fall of 6in. of rain, when added to the water supplied to induce early germination, was sufficient to give rise to four months of excellent growth.

“ I have stated that normally Berseem is a winter-growing plant; Mr. Place, of the Stock Department, has informed me, however, that it is grown fairly extensively in the West of England in summer both for hay and for grazing purposes. It would seem possible, therefore, that both in Tasmania and New Zealand Berseem might find some unoccupied gap into which to

step; possibly, too, in some of our colder districts it might make satisfactory summer growth, although on the whole I am inclined to doubt it.

SOILS.

"I was informed in Egypt that, although Berseem adapted itself well to most types of soils, it always showed to best advantage on heavy clay soils. Our limited experience of this season would appear to confirm this view. The Berseem was sown on recently graded land, over portion of which the raw, stiff, clay subsoil lay exposed; and it is on this stiff clay that the Berseem has made the finest growth.

"According to G. P. Foaden, Berseem is used in Egypt as a test crop in reclaimed lands; as soon as a good stand of clover can be secured the land is judged to be sufficiently leached of salt to carry any other irrigated crop.

THE POSITION AND GENERAL TREATMENT OF BERSEEM IN EGYPT.

"The extraordinary fertility of Lower Egypt is probably not equalled anywhere else in the world. Year in, year out, with but little help from manures, this wonderful silt turns out successfully two crops a year—a summer crop followed immediately by a winter crop; and this it has done from time immemorial. Mr. G. P. Foaden, in his notes on 'Egyptian Agriculture,' is inclined to attribute this sustained fertility, in part at all events, to the universal use of Berseem. According to this writer, Berseem, from which two cuts have been taken, leaves in the soil a residuum of 300lbs. of nitrogen to the acre. Independently, therefore, of its direct value, Berseem would appear to have a renovating influence on this ancient land of Egypt.

"I could not secure any definite figures as to the area yearly under Berseem in Lower Egypt; but it would appear that apart from the wheat area, which latterly has shown a tendency towards steady decrease, the whole of the country is under Berseem for six months of the year or thereabouts; and for Egyptian live stock these months represent the months of plenty. Horses, buffaloes, bullocks, sheep, every form of live stock are fed on nothing but Berseem during these months; and I can add that their general appearance testifies to its value as a foodstuff. In summer, with no Berseem available, I was informed that their condition is often pitiable in the extreme.

"In Egypt Berseem is made to follow immediately in the wake of a summer crop, generally cotton or maize. It would appear that, with a view to securing an early start, the Berseem seed is frequently sown before the summer crop has been actually harvested. The latter is heavily flooded, and the seed is scattered over the surface before the surface water has had time to disappear. At this time of the year the ground is still warm, and germination is almost immediate; within two or three days the young plants show above ground. In other cases the land appears to be ploughed after the removal of the summer crop, but this practice does not appear to be general. The chief aim of the

grower appears to be early seeding, so that he may find himself with a good cut of Berseem as early in the winter as possible.

Our own experience this season would appear to confirm the advantages of early seeding. We were obliged to germinate the Berseem by artificial irrigation; patches in the field were missed, and germinated later under the influence of mid-May rains. These patches never caught up to the rest of the field which had germinated in April; not even after the first cut.

"The seed is sown at the rate of 40lbs. to the acre, representing in Egypt a value of about 10s.

"The crop is usually irrigated two or three times before the first cut is secured; the latter is available from 45 to 60 days after seeding, according as it has been sown early or late. The first cut is followed by a second and a third cut; and sometimes by a fourth cut; the latter, however, is never heavy and is usually reserved for seed, of which 6bush. to 7bush. to the acre appear to be harvested. Between each cut Berseem is usually flooded twice; it is usual, however, to wait until the new shoots show well above the ground.

"So far as I was able to ascertain, the crop is generally cut, but not grazed; it is so succulent that grazing would inevitably lead to much waste. Live stock however, appear to be tethered on a portion of the field which has been cut down and to which daily supplies are conveyed to them.

"Both the first and the second cuts of Berseem are said in Egypt to yield about 8 tons of green stuff to the acre; of the two cuts, the first one is the more succulent and watery, and the second one the more nourishing. The yields of later cuts are always lower. I was informed that one cut from an acre of Berseem will supply 100 bullocks with one day's feed; whilst from half to three-quarters of an acre of Berseem will keep a working bullock for six months.

"In Egypt hay is occasionally made from Berseem, when 5 tons of green stuff dry out to 1 ton of hay.

BERSEEM AT ROSEWORTHY IN 1911.

"At the time of writing—early September—I am able to give only a partial account of our experiences with Berseem; we are in the midst of the second cut, and the third cut is making fair progress.

"Berseem was sown at Roseworthy in the present year on a patch of ground that had recently been graded for irrigation purposes. The land was graded to an even slope of 3in. in the chain, and was somewhat difficult to handle seeing that in places as much as 16in. of soil had to be transferred from one corner to another; hence, after grading operations the subsoil was exposed over the greater portion of the field. Wherever the subsoil was thus exposed I thought it wise to dress the land with well-rotted farmyard manure at the rate of 20 tons to the acre. This was done in early March of the present year. From 21st to 30th March the land was ploughed once and rolled

twice. On April 3rd 2½ cwt. of superphosphate were drilled in to the acre, and on the 5th Berseem was broadcasted at the rate of 30 lbs. to the acre. The seed was rolled in with a plain land roller, and the surface soil was subsequently stirred slightly with an American weeder. Sprinklers were set going on April 6th, and continued at work until the land was judged to be sufficiently soaked.

"The first cut was started on June 16th, i.e., 72 days after seeding. This is somewhat later than is stated to be the usual case in Egypt, where, no doubt, the warmer climate and repeated waterings will serve to bring on the crop more rapidly. I have no doubt that had I sown the Berseem in



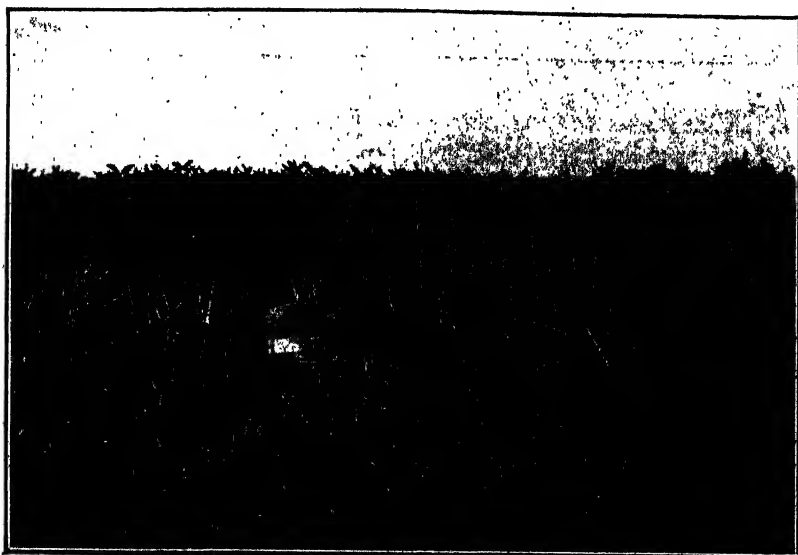
General View of Second Growth of Berseem, Roseworthy College. Sown April 5th, 1911, Photographed August 15th.

early March, instead of early April, and watered it once or twice after it had shown above ground, the first cut would have been available sooner than actually proved to be the case. I wish to state that I purposely abstained from watering the Berseem more than was actually necessary for germination, because I wished to ascertain how it would develop on our normal winter rains. Unfortunately this season the latter were below average, and for a while at all events the crop showed signs of hanging fire.

"At the time of the first cut we were very short of feed, as indeed proved to be the case throughout the winter; there was the likelihood, too, that our chaff supplies might run out before next hay season. I decided, therefore, to feed the Berseem to our milking herd, which included an average of 24 cows in milk. The first cut, which extended from June 16th to August 1st—

a period of 45 days—supplied two meals a day to the herd from an area of one and a half acres. The total yield of green stuff per acre was represented by 9 tons 3cwts. 27lbs. I must state here that in my preliminary estimate given to the Advisory Board of Agriculture in July, through an error in figures, I over-estimated the yield of the first cut. It will be admitted, however, that the actual figures are still very satisfactory for winter-grown feed.

“The second cut was started on August 3rd, but was interrupted repeatedly, as other sources of supply for the dairy herd gradually became available. Up to September 8th we have cut 5 tons 13cwts. 4lbs. from 0·78 of an acre,



Close View of Second Growth of Berseem.

representing a yield of 7 tons 4cwts. 10lbs. to the acre.⁵ Those visiting the College next Monday will be able to see portion of the second cut still standing, and the third cut growing well behind it. I shall probably irrigate the third cut, as I wish to save it for seed, so that next year I may be able to compare results from locally-grown seed with those from imported seed.

BERSEEM AS A FOODSTUFF.

“I have already stated that all kinds of live stock take very readily to Berseem, and that they will eat it at any stage of growth. It is not necessary, therefore, to wait until the crop is in bloom, as is often the case with lucerne. This, of course, is a great advantage, since Berseem may be cut so soon as it attains to 15in. or 16in. in height, and subsequently in proportion to

immediate daily requirements. Nor does Berseem taint milk in the slightest degree—a reproach that is sometimes levelled against lucerne.

“I owe the following analysis of the first cut of Berseem to Mr. J. H. Phillips B.Sc. (Lecturer on Chemistry at the Roseworthy Agricultural College). Side by side with the analysis of Berseem I have shown the average composition of several other green forages for purposes of comparison.

TABLE I.—*Showing Composition of First Cut Berseem Comparatively with the Composition of Several Other Green Forages.*

	Berseem.	Green Oats.	Meadow Grass.	Red Clover.	Lucerne—	
					Young.	In Bloom.
	%	%	%	%	%	%
Water	90.20	81.00	80.00	83.00	81.00	75.00
Ash	1.56	1.40	2.00	1.50	1.70	2.20
Fibre	1.66	6.50	4.00	4.50	5.00	8.40
Proteids	2.06	2.30	3.50	3.30	4.50	4.30
Fats	0.12	0.50	0.80	0.70	0.60	0.80
Carbohydrates ..	4.40	8.30	9.70	7.00	7.20	9.30

“The outstanding features in the composition of Berseem of the first cut is its extreme succulence, represented by the presence of an unusually high proportion of water, the low proportion of fibre and carbohydrates, and the very narrow albumenoid feed ratio. We may look upon it as essentially well adapted to the feeding of young and growing animals and to the production of milk, particularly if used in conjunction with some dry or farinaceous foodstuff. Mr. Phillips will make analyses of later cuts, which it will prove interesting to compare with that of the first cut.

THE PROBABLE ROLE OF BERSEEM IN SOUTH AUSTRALIA.

“I take it that, next to drought-resisting fodder plants, if there is one thing that many of our districts stand in need of it is a fodder plant that will become rapidly available in the early winter months. Particularly is this the case with the dairymen whose stores of ensilage will generally have been exhausted by the dry summer months, and who in the early winter are generally at a loss for succulent foodstuffs. This special need, I am confident, Berseem can make good in many instances. Let us examine under what conditions this is likely to be the case.

“Much has been said and written within recent times as to the untold stores of wealth we shall unlock when once we make up our minds to turn to irrigation seriously. Our limited experience in this direction, however, has already shown us that with our diminutive population the fresh fruit market is easily glutted. Our experience with dried fruit has been on similar lines; and the fact that in these commodities we cannot hold our own on

local markets except under favor of high protective duties shows how little we have to hope from exports. With irrigation on a larger scale than at present obtains we are therefore in a very large measure thrown back on dairying, the products of which have, at all events, high export value. In such circumstances, wherever possible, lucerne, which is not deemed worth growing in Egypt, receives, as a rule, first attention from us, and naturally so too; for once established, beyond periodical watering and cutting, lucerne calls for little attention for a period of six years to ten years or thereabouts. But, after all, lucerne does not continue at its prime indefinitely, nor is it a winter-growing fodder plant; hence probably on most irrigated farms some portion of the area will be allotted to crops of maize, sorghum, millets, &c., in the summer months side by side with lucerne. Wherever this is the case, and particularly on rich land such as the Murray swamp land, I strongly recommend the sowing of Berseem as early in the autumn as possible on the maize or sorghum stubbles. I am convinced that the returns secured will amply compensate any dairyman for the expense involved. Let it not be forgotten, however, that early sowing is the key to heavy crops.

"It is quite possible—although on this point I am less confident—that Berseem sown early on clean land and brought up naturally by the first autumn rains will supply heavy crops altogether independently of artificial irrigation. In such circumstances, however, its first growth will be made at a time of the year when the general temperature is lower, and when it will have more to fear from the competition of rank-growing weeds; hence I take it to be essential that the Berseem be sown on tolerably clean land.

"Can Berseem be grazed? Where it is sown thickly and its growth is heavy this does not appear to me possible without considerable losses from trampling down under foot. Nevertheless, Mr. Place informs me that in the West of England it is a common practice to graze Berseem. If such is the case it could with great advantage be sown over the stubbles as an early catch crop in the same way as rape. It presents the great advantage of growing considerably faster than the latter in cold weather.

"I believe, too, that as a green manure for vineyards and orchards Berseem has much to recommend it. It is a leguminous plant, and therefore nitrogen-collecting; it is soft and succulent, and therefore susceptible to rapid decomposition; it makes strong and rapid winter growth, and may therefore be ploughed under sufficiently early to admit of the land being left in a suitable state of tillage in early spring.

EXPERIMENTS WITH BERSEEM AT ROSEWORTHY NEXT SEASON.

"In referring to the handling and general treatment of Berseem, I have had naturally to rely mainly on what I was able to gather last year in Egypt, coupled with one season's rough experience at Roseworthy. Next year I

propose submitting this promising forage plant to a rigorous series of tests which I have summarised briefly below :—

“ 1. I propose testing the rate of seeding. In Egypt the average rate of seeding appears to be about 40lbs. to the acre. I understand, however, that at times as much as 60lbs. to 70lbs. to the acre are seeded. In 1911 we found 30lbs. to the acre a very fair rate of seeding. It is possible, however, that 20lbs. will prove sufficient for all purposes; and even lighter dressings may be necessary where it is proposed to graze the crop exclusively.

“ 2. I propose testing the influence of early and late seeding, for on the success of comparatively late seeding hinges the possibility of growing Berseem to advantage where no means are available to cause it to germinate artificially by irrigation.

“ 3. I propose testing its grazing value both as a carefully grown crop, and as a catch crop roughly put in on stubble land.

“ 4. I propose testing locally-grown seed against imported seed. It is always possible in such cases that imported seed may be responsible for rapid growth and development for which we may look in vain, from locally-raised seed.

“ 5. I propose testing carefully early-sown Berseem against barley, *Phalaris commutata*, and Broad-leaf Essex rape, all of which will receive exactly the same treatment.

“ In this connection I noticed with amusement in one of our daily papers that an anonymous correspondent almost rebuked me for recommending to South Australia a new winter-growing forage plant. Had I, he added, ever heard of *Phalaris commutata*, a perfect winter-growing forage plant? This plant has been so efficiently boomed during the past few years that it could not possibly have escaped my notice. But, more than that, we have grown it at Roseworthy; and however useful it may have proved elsewhere, we have failed to discover any particular virtues in it. We have this season at the College small plots of both Berseem and *Phalaris commutata* under exactly similar conditions of treatment, and we were able to take two cuts of Berseem before one cut of the famous winter-growing perennial Canary grass was available.

“ 6. I propose ascertaining as much as circumstances permit of the exact feeding value of the various cuts of Berseem.

“ 7. I propose testing the value of Berseem as a green manure for orchards and vineyards.

“ 8. I shall keep an exact record of the winter surface soil temperatures of the various plots under Berseem.

“ I recognise that these tests can have definite reference to one district only, viz., the district in which I am working. Nevertheless, I trust they will be taken to have some bearing on districts similarly situated. The Advisory Board of Agriculture has recommended the importation of seed

by the Government for distribution amongst growers, and I trust therefore that next season, at all events, Berseem will be given an effective trial on the Murray swamp lands, on which I am convinced it will prove almost as great a boon as in the rich Nile silt."

The Chairman—"I think this Congress is indebted to Professor Perkins for the valuable information he has given us."

Replying to questions Professor Perkins said—"There is no doubt Berseem is a very succulent food, but if fed cut I do not think there would be any danger to cattle. With all clovers care has to be exercised in feeding, and Berseem is no exception. I ordered 440lbs. of seed and it cost me between £6 and £7 delivered. It was sown broadcast. I am not yet in a position to say whether water charged with salt will injure Berseem or not, but the value of Berseem is so great that I advise testing it, no matter how salt the water is, and see the result. I am under the impression that Berseem may be of use in the Lower North, at all events where we get rain in April; but if the rain holds off until May I do not think it would be of much value. The land at Roseworthy was not specially prepared for Berseem, as I did not intend when it was prepared growing Berseem there."

WEIGHING WHEAT IN BULK OR BY THE LOAD.

Mr. J. P. Pontifex (Paskeville) initiated a discussion on the subject of "Weighing Wheat in Bulk or by the Load" by reading the following paper:—

"The idea of ascertaining the weight of wheat by the load is by no means new in many places outside South Australia. I think I am justified in saying that when the production of wheat is the main item of consideration, generally speaking, the South Australian is to be found up to date and well advanced. It is not necessary to mention that it was in South Australia that the first machine was constructed and used for stripping the heads from off the wheat, and that in South Australia the stump-jump plough first came into operation, thus making available for wheat-growing thousands of acres of land previously considered to be worthless. By means of these labor-saving implements the production of cereals in South Australia has been largely increased; therefore, I think it has become necessary for us to make an attempt to bring about a change from the present slow and tedious method of weighing each bag of wheat separately by the wheatbuyer's agents and merchants at our wheat-receiving centres. I wish it to be understood that I have nothing to say against the wheat buyers and lumpers, as I am satisfied that their part of the work under existing circumstances is performed as expeditiously as we have a right to expect. In wheat-receiving yards where some years ago the number of bags of wheat could be counted in hundreds, thousands are now received. It is not an unusual sight in the wheat season to see yards filled with teams waiting their turn to be unloaded. Every farmer knows what this loss of time means to him in the harvest season. If in South Australia

the system was adopted which prevails in Victoria and in New South Wales this loss of time would be obviated. A South Australian farmer of Petersburg, now a resident of Landra, New South Wales, in the course of an interview recently, said—"You may not realise it, but settlers in wheat land in New South Wales are catered for more than the South Australian farmers. Nevertheless, in the matter of handling wheat the wagon load is weighed on the railway station bridge and the bags are tipped into the trucks. It saves time and trouble in unloading. In South Australia the agent weighs each bag separately, and in a strong wind his weights are not exact; moreover, any loss of grain in the double loading is the loss of the farmer and not of the merchant. In New South Wales we get absolutely full weights."

THE DISCUSSION.

Mr. E. W. Radford (Carrieton)—"My Branch considered this question months ago and came to the conclusion that the method of weighing wheat in South Australia at the present time is absolutely out of date. I believe weighing wheat in bulk is the only true way of weighing it. Suppose we lose 7lb. a bag, as I believe we do very often through defective scales, with the quantity of wheat grown in my district last season that would mean a heavy loss. I hope the time will come when we will have elevators erected at the different railway stations, so that the wheat can be dealt with on modern lines similar to those adopted in the United States and Canada."

Mr. F. Byerlee (Carrieton)—"Last year there was a great discrepancy in the weights. A lot of my wheat was taken to the yard and weighed, but the agent was not satisfied, and after I left the yard he weighed it again, with the result that it went three bushels less than when it was weighed in my presence. I move—That this Congress recommends that the weighbridge system be instituted for the weighing of wheat."

Mr. H. G. Hawkins (Port Pirie)—"I second the motion."

A Delegate—"At last Congress it was said that the district councils were responsible for testing the scales, but I have found that in Pinnaroo the district council has no system of testing the scales. Some of the scales are in a disgraceful condition and are not fit to weigh wheat on."

Mr. F. Masters (Bute)—"If the weighbridge system is installed you may rest assured that the producers will have to provide the necessary funds."

Mr. J. Malcolm (Kadina)—"There are two sides to the question. If the wheat is weighed by the load it will have to be again weighed in bags before shipment. (A Delegate—"They do that now.") I have been connected with the buying and shipping of wheat for the last 33 years, so I know what I am talking about. I fail to see how the weighbridge system will result in a great saving of time, because if the wheat goes over the weighbridge the wagons will have to wait their turn to be unloaded."

Mr. W. Mitchell (Geranium)—“At one time I was the owner of a weighbridge at Blyth, and I was challenged that I could not weigh a big load of wheat on my weighbridge. The next time the man who challenged me brought 50 bags of wheat to market I weighed the load first and afterwards he took the wheat away and the bags were weighed separately. The total weights were afterwards compared and there was not a difference of a pound between them. Therefore, the farmers should not have any doubt as to weighing wheat in bulk. As regards weighing before shipment, that is always done, because wheat increases in weight in the stack and it would be a direct loss to the merchant not to do so. I am a member of the Pinnaroo District Council, and over 12 months ago the council appointed an inspector of weights and measures and gave him the necessary appliances, so if there has been neglect in that direction it was not the fault of the council.”

Mr. C. J. Osborn (Sherlock)—“The system of weighing wheat in bulk has been in force in New South Wales and Victoria for some time and we cannot remain behind the other States in that matter.”

Mr. B. Cornish (Gumeracha)—“All weighbridges should be fitted with iron platforms. A great many of the weighbridges have wooden tables, and the amount of moisture they take up after a heavy shower is enormous. And if iron plates are used they should have holes bored in every section so that the water will run off. I have found that even an Avery scale which is protected from the rain will gain or lose according to the moisture in the air.”

Mr. D. F. Bowman (Wilkawatt)—“In a good many instances the scales are not sufficiently tested. Last year I took a load of wheat in and after seven or eight bags had been taken off the wagon and weighed I was dissatisfied, and when the scales were tested it was found that every bag had been weighed 8lbs. short. That shows that the scales need testing for every load of wheat that comes in.”

After further discussion the motion was declared carried by 58 votes to 53.

The Chairman—“The motion carried amounts simply to a bald resolution. The Advisory Board must have something practical to go on.”

Mr. J. P. Pontifex (Paskeville) moved—“That this Congress request the Advisory Board to confer with the wheat merchants and buyers regarding the proposal that licensed weighbridge weights be accepted.”

Mr. J. Wyatt (Georgetown) seconded the motion.

Mr. W. S. Giles (Mount Remarkable) moved as an amendment—“That the Railways Commissioner be approached to instal weighbridges, and that a small charge be made; based on the weight which passes over them, to pay the cost of interest on construction and maintenance.”

Mr. F. Byerlee (Carrieton) seconded the amendment.

A Delegate pointed out that if the Railways Commissioner were to install weighbridges there was no guarantee that the merchants would agree to their use.

The amendment was lost.

Mr. H. Bottrell (Appila-Yarrowie) moved as a further amendment—"That the matter be referred back to the Branches for their consideration and that they be requested to send their views to the Advisory Board before next March."

Mr. J. Malcolm (Kadina) seconded the amendment, which was carried, and on being put as a substantive motion, was again affirmed.

Evening Session.

Mr. A. M. Dawkins presided over a large attendance of delegates.

THE BREEDING AND FEEDING OF DAIRY CATTLE.

Professor Lowrie, Director of Agriculture, gave an address on "The Breeding and Feeding of Dairy Cattle." He said—

"I selected this subject deliberately in the belief, rightly or wrongly, that there is no item in the whole range of South Australian agricultural practice that is more neglected than is the management of dairy cattle. Your Chairman mentioned last night how greatly the practice of agriculture in many of its phases had improved in this State within the last few years. I could see on coming back here after an absence of 11 years that the management of the land, in the direction, for instance, of conserving the moisture in the soil, on the part of the farmers had greatly improved. The Chairman also referred to the rapid progress which had been made in regard to implements, and there is no doubt he was correct. The implement manufacturers, taking their cue from the farmers' needs and profiting by the hints which the farmers gave them, have certainly shown a great progressive spirit in the way they have developed and improved implements to cheapen the processes of production. In every matter connected with the cultivation of the land there is to-day a keen interest and, I think, a more intelligent knowledge of the position. In fruit culture the same thing obtains. One can see how greatly the methods have improved, how much more general the elementary process, spraying to combat pests, has become. As regards sheep there is also better management, and there is apparently a higher appreciation of the sheep by the farmer than there used to be by a very considerable degree. But, notwithstanding all this progress, I do not think in the matter of the management of dairy cattle any progress at all has been made.

A SHORTAGE OF LABOR.

"I know perfectly well that in these times of prosperity, which undoubtedly the State has enjoyed and is enjoying, there is necessarily a shortage of labor. And the very fact that it is more difficult than it has been, owing to that prosperity, to get the assistance you require on the farm, is just the very fact that handicaps a man who is engaged in dairying, because the ordinary workman will do almost anything except milk cows. (Applause.) There is no doubt there is a difficulty, and a heavy difficulty, as things are. It may be removed and it may not, but if it is at the expense of general prosperity, well, one and all will not like to see it happen. That is the position. The man engaged in dairying finds for the moment greater difficulty in getting assistance than obtains in almost any other branch of the rural industry.

A LONG WAY BEHIND.

"In spite of that there are a large number of men throughout the State who are keeping dairy cattle and facing the difficulties; and I thought, when speaking to the Congress to-night, I could not do better than introduce a discussion on that part of our farming practice which I will say again is the farthest behind of any part of that practice, viz., the breeding and feeding of dairy cattle. I do not wish you to think that I am speaking in any way as a dairy expert. I am speaking merely as a farmer who knows something of the working of the land and the keeping of stock. You may say that there are comparatively few at this Congress who are interested in the subject; but at the same time it is necessary for the officers of the department to recognise that in addressing you they are also addressing a much larger audience than is assembled in front of them. So far as my knowledge of the dairy industry extends, the manufacture of the product, the facilities for shipping and marketing—what may be termed the technique of the industry—leaves not much wanting in South Australia. Perhaps we are just as advanced here as elsewhere in that respect. We have the same appliances, our factory managers are equally qualified, but somehow or other the element in the industry that dwarfs all others—the management of the cow—is, and I say it deliberately, a long way behind what is possible under our circumstances. Now do not for a moment think that I have changed my mind as I have grown older. I may have said before in this respect that a very large part of South Australia is best utilised in the thorough management of sheep and the growing of wheat. As regards a large part of the State is is better for everyone that wheat and sheep should be the general practice than that dairying should be attempted. In speaking of dairy cattle to-night, therefore, my remarks refer to fair rainfall districts which are not so well adapted for wheat and sheep as is the medium rainfall country. I think the dairying industry ought to be centred round those heavier rainfall areas where a supply of succulent forage can be kept up throughout the year and the stock properly treated,

DEFECTIVE MANAGEMENT.

"It is characteristic of Australasia that the dairy-farmer—no doubt with exceptions and sometimes with great exceptions, but on the general average—does not manage his stock in the same careful manner as the pastoralist manages his sheep, or the farmer who keeps sheep manages those sheep. And yet the loss through the defective management of dairy cattle is enormously greater than the loss which results from the slipshod management of sheep. Take the case of a sheepfarmer who over estimates the carrying capacity of his country. When it is all summed up what does that mean? His sheep might have a break in wool, and he would probably lose 1d. per pound or less; he could not finish off his lambs and would lose at most 3s. or 3s. 6d. each if he had to sell them as stores instead of fat lambs. Through his improper management, then, a sheepfarmer would, on a fairly extravagant estimate, lose 4s. per ewe. Yet if we take seven sheep as equivalent to a dairy cow so far as the carrying capacity of the land is concerned, the sheepfarmer's loss through improper management would be 28s. on the land which would have carried a cow. Now take it from a dairy point of view. The man who neglects to feed his cattle as they should be fed for milking returns will lose from 100galls. to 150galls. per cow for the season. I think you will agree that if anything that is an under estimate. If we take the loss at 100galls. it amounts to something like 35s., and if we take the loss at 150galls. it amounts to about £2 10s.; consequently the loss on the same land through the bad management of dairy cattle is nearly double the loss which would be occasioned through the bad management of sheep. But while all over Australasia comparatively few men neglect the sheep, only a small percentage exercise first-class management in regard to their dairy cattle. You can drive over the roads now and in 99 cases out of 100 you will find that it is the cows which are turned out on the long paddock (the road). You do not find sheep on the long paddock, you do not find the farmers' horses there; but you do find neglected cows grazing on the roads.

HOW TO IMPROVE THE POSITION.

"Now, by what means is the present position to be improved? First let us take the question of stock. As the Chairman pointed out to me, I am telling a twice-told tale, because it so happens that 14 years ago I addressed the Farmers' Conference on somewhat the same subject. On that occasion I remember I was very keen on pedigree—on a pure bred bull—and there was considerable dissent among the audience at my attitude; especially was that so on the part of the man who laid the foundation of the dairy industry in Australia, Mr. David Wilson, who was present that night. Well, I am not ashamed to say that my views now in regard to the matter are somewhat modified. I am constrained to the position that from the dairyman's point of view, which, after all, is the quantity of milk he gets from

his cows, pedigree, although an important matter, is not of the importance I attached to it at that time. On looking up the report of my remarks on that occasion I find that I said that if I could get a crossbred bull from a cow giving 800galls. or 900galls. I would hesitate to use him.

MENDEL'S LAW.

" But, in the light of the progress made in biological science, one has had to somewhat modify their views on that matter. Within the last 10 years there has been shown to the world an advance in biology that is probably the greatest since the time of Darwin, viz., the rediscovery of Mendel's law. You have heard of that in relation to wheat, and that law has been followed up in regard to all forms of breeding. Men have been going right back through the cattle stud book to see whether the Mendelian law holds in the breeding of cattle; they have been doing the same thing in regard to horses, and they have been practising empirically the cross-breeding of sheep to see if the results conform with the law. So far as animals are concerned there are a large number of conflicting factors which will take a generation to thoroughly measure and work out. Wilson, of Dublin, has been working on the Mendelian method, and he published the results he obtained a few weeks ago. He advanced the hypothesis that the milking characteristic is a Mendelian feature—that the other characteristics of the animal can be lost sight of, and that attention might be kept on that particular one. He states that in full-sized breeds there are three grades of cows—(1) A low grade, giving when properly fed from 450galls. to 600galls.; (2) an intermediate grade, under the same conditions giving from 750galls. to 900galls.; and (3) a high grade, giving when properly fed from 1,000galls. to 1,200galls. It was also found that the high and low grades are approximately pure strains, while the intermediate grade is a Mendelian hybrid between them. Therefore, if you get an animal throughout of milking pedigree that shows high milking qualities back for successive generations, the hypothesis is in favor of the contention that every animal bred from her by a bull of similar milking pedigree will be a good milker; but, as things are at present, you now have cows which give down to below 300galls. and up to 800galls., and use a bull of which you have no means of finding out what the milking qualities of his dam and great-dam were. I think, therefore, you will agree that I am justified in modifying my opinion to this extent—that if you cannot get a pure-bred sire of certified milking pedigree, and can get a less well-bred animal of fully certified milking pedigree, the latter would be the sire to use. This is not scientifically accurate fact, but it is a good working hypothesis with good evidence in its favor.

THE FIRST ESSENTIAL.

" In view of the Mendelian law, and in view of Professor Wilson's hypothesis, which he has worked out from a long series of observations, I think that the

first and absolute essential for the man who wants to work up a dairy herd is to see that every element which he introduces into it carries milking characteristics; but that cannot be secured as we have things now. It cannot be secured by going to shows and buying prize animals. You cannot be sure of getting it in that way—you may if you have luck; but, on the other hand, you may not.

MILK RECORD SOCIETIES.

"The one way to get it is by the dairy farmers in the dairying districts forming Milk Record Societies and keeping a thorough systematic tally of the yields of each of their cows. I am perfectly sure that every expert will bear me out in that statement. If that is done the farmers and dairymen will be amazed to find how great is the difference between the money value return from the best and the worst of their animals. I do not know whether that will be brought about; but if we do not secure the means of finding out the milking pedigree of our dairy stock, then, I say, one of the first essentials of successful dairying will be wanting in South Australia. You know that the practice of recording results is extensively adopted in Denmark, and I have lately looked up the results obtained by the Milk Record Societies in Scotland. Those societies were established by a man named John Speir, who did an immense amount of valuable work for the dairying industry. He got cow-testing societies established in a comparatively small way in the west of Scotland, and for the first few years afterwards had a troublous time, because when the records came to be published the owners of some of the dairy herds would have liked to have smothered him. They withdrew from the association, but nevertheless it continued. In its last report the Highland Agricultural Society states that a large number of these milk record societies in the western counties have amalgamated and are working as a big society, and last year tested at regular intervals 9,200 cows. More than that, those who had come out well in the tests found that they had no difficulty whatever in selling their young stock. The tests were made by independent men especially appointed for the purpose, their services being paid for by a grant of £200 from the Highland Agricultural Society, the farmers themselves making up the remainder of their salary. And the farmers have found that the amount they have to pay for that work comes back to them many times over. In the published results of the tests the animals are classified as 'good,' 'indifferent,' and 'bad,' and the figures revealed the fact that each farmer had so many 'good' cattle, so many 'indifferent' cattle, and so many 'bad' cattle. To be classed as 'good' a cow had to yield within a year—not her milking period, but 365 days—714galls., and a heifer to be included in the same group had to yield 570galls. The cows that are classed as 'bad' are those which yield under 474galls., and the heifer that yields under 380galls. also comes within that description. Now, 714galls. (the minimum yield for a 'good' cow) at 4d. a gallon would be £11 18s. per cow. In South Australia the yield per

cow is no worse than in the other States and New Zealand, where in some cases the natural advantages are better. But what is our average yield?

Mr. Suter—"About 190galls."

Professor Lowrie—"I think you are putting it too low. Shall we say 250galls. to 300galls. Taking it at that you see we would have to multiply our yield per cow by nearly three to get up to the average of the cows classed as 'good' in Scotland. The Fenwick Society in Scotland tested 951 cows and heifers, and of that number 359 cows and 86 heifers, or a total of 445 were classed as 'good,' and only 35 cows and 11 heifers, or a total of 46, were classed as 'bad.' And you must bear in mind that a cow, to escape being classed as 'bad,' had to yield a good deal more than the average yield in South Australia. Now, gentlemen, if I have not got a case which will convince the greatest cynic, I do not know where it is to come from. If a man is working a dairy at all, surely it is necessary for him to be as anxious to improve his position in that respect as he is in other directions.

THE MILKING PEDIGREE.

"The milking pedigree, then, is what we have to look for and what, I think, the farmers in South Australia will have to give attention to before they get that progress as regards the yielding capacity of their cows which they must desire and which all would like to see. And I will put it very strongly. If I were asked which it was better to forego, the agricultural shows or cow-testing associations in dairying districts, I would say, forego the shows if you cannot run both. I am confident that the improvement which would be made in dairy cattle by having cow-testing associations would bring in bigger money than do agricultural shows. As the Minister said last night, the Government is prepared, if only those cow-testing societies get established, to help pay the expense.

THE FEEDING OF DAIRY CATTLE.

"So much for the breeding, as I cannot go into every detail; and now I would like to say something about the feeding. I think the best argument I can use to encourage the dairy farmer to feed his stock fully and generously is simply to state the position from the point of view of the work the cow does. Take it that you have a good cow which yields 600galls. of milk within the year. Now, that cow, in yielding 600galls. of milk gives 772lbs. of solid matter, namely, fat, 230lbs.; albuminoids, 200lbs.; milk sugar, 300lbs.; and ash 42lbs. And that solid matter is as difficult, indeed, it is more difficult, to manufacture than is the same amount of material in the body weight of an animal. Think what that means. It is nearly twice the weight of the dry matter in the body of a cow of 900lbs. to 1,000lbs. live weight. A lot of people seem to think that the udder is like the widow's cruse—that you can keep on drawing milk from it without putting anything in it. (Laughter.)

But you know that a cow only yields milk in proportion to the quantity and quality of the foodstuffs she gets. The best cow that was ever bred cannot yield higher than you feed her. You might as well expect to get power out of a steam engine without coal. Then, a cow yielding 600galls. of milk has, in addition, to keep up her body weight, she has to keep up the animal heat, the power of her muscles, and she has to use food to supply the energy for the manufacturing processes within the udder itself; consequently, only one-third of the total energy taken in the form of food can possibly come out as milk, and yet, out of that one-third, the cow manufactures twice the weight of the dry matter of her body within a year. Let me put it in another way, following Lawes' and Gilbert's figures. A well-treated bullock will put on, say, 10lbs. to 12lbs. per week, and it will take him 22 weeks to fatten. The milking period is 44 weeks, so that during that time two bullocks would fatten. It would mean, therefore, that those two bullocks putting on, say, 12½lbs. of live weight each per week would, under the most favorable conditions, put on during the lactation period of 44 weeks, a total of 549lbs. live weight. That live weight would be made up as follows:—Water, 135lbs.; albuminoids, 42lbs.; fat, 364lbs.; and mineral or ash, 8lbs.; total, 549lbs. So, while the cow in 44 weeks puts up 772lbs. of solid matter, those two bullocks only put up 549lbs. of live weight or 414lbs. dry matter. In fact, she gave nearly as much solid matter in her lactation year as four bullocks, which had each taken 22 weeks to fatten, would put on in weight of solid matter. There you have the machine. Feed her well and she does that; but, on the other hand, it is absolutely impossible that she can do it unless she is well fed.

HOW TO IMPROVE THE FOOD.

"Now the question arises, to what extent can the feed of dairy cows be improved. I think you can improve it by providing foodstuffs for that time of the year when the natural pasturage is not suitable or is insufficient. You want to keep up the supply of succulent forage. I know you will say that it costs money to do that, but if a milking cow is allowed to get dead poor in the winter time, and is turned into grass in spring, she is too weak to do justice to herself. The cow has so much to pick up that the feed is going into seed and getting dry before she is in a position to show what she can do. Natural pasturage is the cheapest and best you can offer the cow, but the conditions in this State are such that natural pasturage is not available throughout the year. But I am convinced that there are many places where a small expenditure would give the means of helping to keep the cow healthy on dry feed which must necessarily form the bulk of her food. I refer to the growing of summer crops. But to grow summer crops properly the land has to be thoroughly well prepared. It should be winter fallowed and deeply cultivated. Cart farmyard manure on to the land in autumn, plough

deeply, and then work it up with all the moisture in it. You can sow maize, sorghum, and, above all, mangels. There are dozens of places where a man can have a good standby of this forage root for winter feed. Then, again, with ordinary winter crops, you can sow a mixture of oats and pease, drilled in with a generous dressing of manure, for hay or silage. You can cut it for hay or make it into silage, or let it ripen and thrash the lot together and feed it instead of buying bran for cows. That is a point that is often neglected. I was astonished when I first tried a combination of vetches and oats. Let me say, in conclusion, that I hope the farmers in South Australia will give that attention to dairy cattle that, as your Chairman indicated and I am glad to recognise, you give to other things. I am sure if you do so you will find your returns increase to the satisfaction of everyone." (Applause.)

THE DISCUSSION.

Mr. A. J. Wedd (Mount Gambier)—"Speaking of the South-East, I think if the cattle were provided with shelter it would improve their condition. I think it is necessary to provide shelter for milking cows in order to get a full flow of milk. Very often farmers instead of providing winter food for dairy cattle overstock, with the result that the animals are impoverished."

Mr. J. Malcolm (Kadina)—"The experience of some men in my district is that dairying carried out on the lines indicated by Professor Lowrie pays handsomely. I think many farmers neglect the dairying industry because they have done so well with wheat."

Mr. J. Smith (Hawker)—"I would like to express our pleasure at having Professor Lowrie back with us again. I am certain if we follow his advice in respect to the dairy cow it will be to our benefit."

Mr. J. W. Sandford (Member of the Advisory Board)—"Like everyone in this room, I appreciate the address given by Professor Lowrie. Authorities have said that in no other country are the milking properties of the cow on a lower grade than in Australia. That is very serious, and it should not be so. The average yield in Australia is 250galls. per head. In South Australia the yield is a little better, but it is not much more than it is in Victoria. What a great difference that is to the yield in Great Britain you can imagine, therefore what a great amount would be gained in money if farmers and others selected only cows from good milking strains and provided them with good food all the year round. In Australia the gross yield per cow is something like £6, but in some countries it is something like £13."

Mr. T. Hawke (Willowie)—"I think the comparison of the yield per cow given by Professor Lowrie is somewhat misleading. The average yield in South Australia, 250galls., is for the whole of the State, and includes districts which are not dairy districts at all. If the yield here is taken in similar country to that with which it was compared I am sure the average would be more than 250galls."

Mr. A. V. Nairn (Mallala)—“ I wish to ask Professor Lowrie if he has not made a mistake in putting the improvement of dairy cattle first. I think before we start improving our stock we should make provision to properly feed what we have already got. The stock we have now have not as yet had a chance to show what they can do.”

Mr. N. S. Giles (Mount Remarkable)—“ I entirely disagree with the last speaker. I think before we go to a large expense in making provision for the proper feeding of dairy cattle it is just as well to have something worth feeding. From my personal experience I am convinced that no amount of feeding would make some of them any better.”

Professor Lowrie—“ It is, of course, the case, and I said as much, that our average in dairy returns is handicapped by what might be called the marginal line of cultivation ; but, at the same time, I think it would have been possible to take the average yield of a well-managed dairy herd in South Australia and to have compared that with the usual average, instead of making the comparison with the yield in another country. Though I dealt with the breeding first, I did not try to make it the most important matter. Unquestionably the most important cause of dry bible was dry, innutritious feed. If they had silage and a bit of green stuff, and probably helped things out with a little bran, they could afford to laugh so far as dry bible was concerned.

MEMORIAL TO THE LATE MR. MOLINEUX.

Mr. J. W. Sandford referred to the late Mr. A. Molineux and the efforts which had been made to do something to perpetuate his memory. He said—“ Quite a number of those present no doubt are aware that an effort was made to secure a sufficient sum of money to establish a scholarship at Roseworthy College to perpetuate the memory of the late Mr. A. Molineux. Unfortunately, however, the amount (£150) subscribed was not sufficient for that purpose. You all know that the late Mr. Albert Molineux devoted his life's work to the establishment and organisation of the Agricultural Bureau in South Australia, with the result that that Bureau is now the greatest thing of its kind in Australia. Mr. Molineux and the late Hon. F. E. H. W. Krichauff can each be termed the founders of the Agricultural Bureau, and I believe the success of South Australian farming of the present day is largely due to their efforts to bring about the improvement of the men on the land in the knowledge and practices of farming. (Applause). The committee has appointed trustees consisting of your Chairman (Mr. A. M. Dawkins), Professor Perkins, and myself to deal with that sum of £150 which was obtained, and it has been decided that it shall be invested, and the revenue or some portion of it devoted to purchasing books to be awarded to students at the College as prizes each year. We are desirous of doing something more than that—of securing a photograph of the late Mr. Molineux, with a suitable

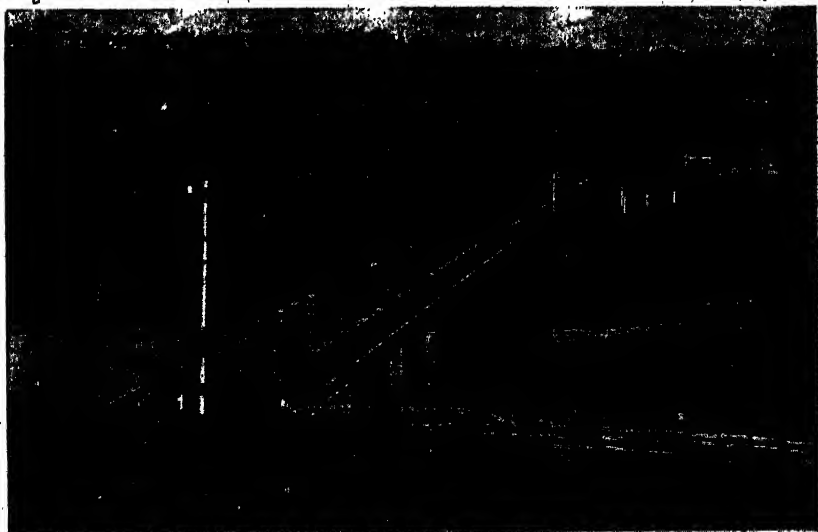
inscription attached, to be hung in Roseworthy College. I think that all the members of the Bureau should have an opportunity of subscribing 1s. or more to the fund to be raised for that purpose. It has been suggested that if members so desire we might also obtain a photograph of the late Hon. F. E. H. W. Krichauff, and it is proposed that any surplus should be added to the original fund." (Applause.)

Mr. A. M. Dawkins (Chairman of the Advisory Board) said—"I think, considering we owe the establishment and work of the Bureau to the late Mr. Molineux, who devoted his time and money in order that he might benefit his fellow-men, the least we can do is to carry out the scheme outlined by Mr. Sandford."

The session then closed.

[During the sittings of the Congress the sum of £6 16s. 9d. was subscribed for the purpose mentioned.—ED.]

(To be continued.)



MURRAY BRIDGE.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Oct.	Nov.			Oct.	Nov.
Amyton	301	3	1	Meningie	*	7	4
Angaston	*	7	4	Millicent	*	10	14
Appila-Yarrowie	*	—	—	Miltalie	321	7	4
Arden Vale & Wyacca	*	—	—	Minlaton	*	14	11
Arthurton	317	—	—	Mitchell	*	7	4
Balaklava	310	—	—	Monarto	327	—	—
Beetaloo Valley	305	—	—	Monteith	*	—	—
Belalie North	*	7	4	Moonta	*	—	—
Blyth	311	10	14	Morchard	*	—	—
Bowhill	*	—	—	Morgan	†	8	4
Bowmans	313	6	2	Moorlands	*	—	—
Bute	*	4	1	Morphett Vale	†	—	—
Butler	*	—	—	Mount Bryan	†	7	4
Caltowie	*	7	4	Mount Bryan East	307	7	4
Carrieton	*	5	2	Mount Gambier	*	—	—
Cherry Gardens	329	3	7	Mount Pleasant	†	13	10
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Clarendon	330	2	6	Mundoorra	*	—	—
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Oocomooroo	301	—	—	Naracoorte	337	14	11
Ooonalpyrn	*	—	—	Narridy	*	—	—
Cradoek	*	7	—	Northfield	315	3	7
Crystal Brook	*	—	—	Parrakie	328	7	4
Cummins	*	7	4	Paskeville	†	5	2
Davenport	303	—	—	Penola	†	7	4
Dawson	303	—	—	Penong	321	14	11
Dingabledinga	*	13	10	Petina	325	—	—
Dowlingville	*	—	—	Pine Forest	†	3	7
Elbow Hill	320	—	—	Port Broughton	*	6	3
Forest Range	330	5	2	Port Elliot	*	21	18
Forster	*	—	—	Port Germein	*	—	—
Frances	*	6	3	Port Pirie	*	7	—
Freeling	314	—	—	Quorn	†	—	—
Gawler River	314	—	—	Redhill	309	31	—
Georgetown	*	7	4	Renmark	329	—	—
Geranium	327	28	25	Saddleworth	*	20	17
Green Patch	320	29	6	Salisbury	315	3	7
Gumeracha	330	2	6	Shannon	*	—	—
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Hookina	†	7	11	Strathalbyn	†	2	6
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Kybybolite	336	5	2	Wepewie	304	—	—
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Lucindale	336	—	11	Wilmington	306	4	1
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Maitland	319	5	2	Woodside	*	—	—
Mallala	314	2	6	Yadnarie	326	7	4
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MacGillivray	*	—	—	Yongala Vale	*	7	4
Meadows	*	—	—	Yorkestown	*	14	11

* No report received during the month of September. † Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by GEORGE G. NICHOLLS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

Amyton, September 5.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. T. O'Donoghue (chair), Brown, Ward, Gum, Aitken, Thomas, Crisp (Hon. Sec.), and one visitor.

CARE AND TREATMENT OF FARM HORSES.—Mr. Crisp read the following paper on this subject:—"To get the best work out of our farm horses it is necessary that they should have the best of care and attention, good stables, and good feeding. I prefer a good long, warm, and well ventilated stable, with a long manger for feeding, and this divided off into stalls to hold two or three horses. By this means quiet horses can be put together, the 'bully' can be put by himself, and every horse will get his fair share of feed. Single stall feeding is all right where one man has only to feed from five to six horses; but where he has to feed from eight to ten horses it requires too much time and labor to feed each separately. With the long manger arranged so that the horses can be fed from the front, they are fed more easily and in far less time. Divided off into two or three in a stall they do just as well as when fed separately. I strongly recommend hay chaff with a fairly good sprinkling of oats and bran. Chaff, in my opinion, should be cut about ¾ in. long, and, if hay is inclined to break up, it should be damped down overnight. Then it will have time to get tough before being cut. Oats either whole or crushed are absolutely the best feed I have used. I have used dry wheat, crushed wheat, soaked wheat, bran and pollard, with hay chaff, but there is nothing to equal the oats. Oats and hay chaff are sufficient by themselves, but a little bran helps to keep the animals in a healthy condition. No matter which way wheat is fed to horses, when they are doing heavy work it has a great tendency to give them sore shoulders, and cause them to sweat. With the oats it is not so, and the horses are always in better spirit when fed on this feed. Every horse should have a good fitting collar. Many sore shoulders could be prevented by a little extra care being taken when harnessing in the morning. Let the shoulders be well brushed to take away all dry sweat, then they should be rubbed with the hand before putting on the collar. By this means one can easily detect any semblance of a sore, because if there is one the horse will flinch. If he does, make sure of the exact spot, then have a look at the collar, it will probably be found that the stuffing by some means has got worked into a hard lump. Remove this lump by some means, either by hammering it with a lemonade bottle, or by putting a slit in the lining of collar and taking out a little of the stuffing. In nearly every case of sore shoulders it is necessary to ease the collar in some way. I have found a breast-plate a good thing to give the horse's shoulders a day or two rest. Get an ordinary 4bush wheat bag, cut it down both seams, and then take one half and roll it into a band of about 8½ in. to 4 in. wide, sew in a couple of back straps and a strap to go over the withers, and the thing is complete. Every farmer should rear his own young stock so as to replace his old ones year by year. If he has to buy, at the present price of horses, it means a big expense, whereas if he reared one or two foals every year the expense is comparatively little. These should be broken in from 2 years to 2½ years old. I prefer to break them in at 2½ years, because they are more set and better able to stand their work than at 2 years, and they make better workers."

Coomooroo, September 8.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Berriman (chair), Avery, Robertson, Gregory, and Brice (Hon. Sec.).

PREPARING LAND FOR CROPPING.—The Hon. Secretary contributed a paper on this subject, in which he expressed the opinion that the preparation of the seed bed should commence during the winter prior to the following, i.e., two seasons before the grain was

sown. Summer fallowing should be practised; this would give the rubbish on the land the chance of growing with the early rains. Continuing, he said—"There is no doubt as to the profit to be got out of the proceeding. This ploughing cannot be practised on all of our land, but on every farm there is a certain amount of the ground that can be ploughed at almost any time during the summer. If the farmer goes in for mixed farming he has the stock on the place with which to feed down his cultivation paddocks without extra purchasing, provided his paddocks are not too large. It is after the seeding operations are finished that any land that is too hard to plough in the summer should be ploughed. The more rain that fallow gets on it after it is ploughed the more moisture it will conserve, provided it is worked up and kept with a reasonably loose surface, and not allowed to set hard again. The more moisture that is conserved the less rain is needed to ensure a good return after the crop is sown. This in itself is enough to warrant summer and early fallow with consistent working with harrows and cultivator or scarifier. It is only necessary to plough to a depth of about 3in. in most of our soil. If the white ground is ploughed too deep the limestone rubble is apt to turn up. Limestone is not desirable on the surface for wheat-growing. After once ploughing I would not work to the full depth of the ploughing, but leave an inch at the bottom. Then it would set down into a seed bed without becoming as compact as if it had never been ploughed. It would not pay in this district to go in for the extra deep ploughing, for the extra returns would not compensate the cost. The cultivation has more to do with the growing of a good crop than excessively deep ploughing, as was illustrated by Mr. Richardson at the last Orroroo Conference, when speaking about dry farming. He, of course, advocated deep ploughing where practicable, but showed that the finer the soil was broken and pulverised the more moisture it would take in and retain. If the harrows were run over each time after cultivation it would tend to keep the surface level, and thus keep so much more of the moisture in. If it is left ridgy or rough there is so much more ground that the air can get at directly, and therefore draw the moisture out of it. The greater the surface the greater the evaporation from a tank or dam, and the same applies to a paddock of fallow. With regard to harrowing, it is not of any great benefit to harrow after ploughing, unless it is done before the ground has dried up. If it has been necessary to leave it for any length of time I would leave it till after a rain, and then it would break down better, and also put a surface mulch on the ground that would act as a conductor to the atmosphere, and therefore there would be less fear of the crust setting hard and cracking, as is often the case on our hard land if left untouched after a rain, with the frost and sun playing upon it. As long as it is not too boggy for the horses to walk on the harrows would do a lot of good. When purchasing a new implement for cultivating the fallow I would give skim ploughs a consideration before making my final decision, for in my opinion they work the land more evenly and kill weeds better than the cultivator. They do not leave the ridge behind like tine implements, and they turn droppings from stock in, which adds fertility to the soil. As little dry working should be done as possible; on no account turn over fallow when dry. When dry use the tine implement, for if a soil is turned over when dry the top is dry and the moisture that was on the underneath part of the soil is when turned up exposed to the air and is evaporated. As soon as rain comes after harvest the fallow should be attended to, for it will perhaps bring up a coat of rubbish ready to be killed at seeding time, and from what I can see of some of my land as soon as one crop of rubbish is killed another is ready to take its place. If the roller was used before the drill the grain would go in more evenly." In the discussion which followed Mr. Berriman said that after land was once ploughed it was not advisable to turn it back, but it was preferable to use a tine implement for cultivation, as it conserved more moisture. The plough was best when the land was worked wet, and there was a heavy crop of rubbish to contend with. Mr. Avery thought the skim plough better for killing rubbish if the land was wet, but it left the land too open unless harrows were used or a good rain followed. Members generally agreed that ploughing to a depth of from 3in. to 4½in. was the most suitable for the district. Mr. Berriman said shallow ploughing was all right in wet seasons, as the subsoil was then soft and the roots would penetrate it readily. Mr. Avery thought no harm would result from deep ploughing in a wet season, as the abundance of rain would set the soil down well. Deep ploughing in a dry season was likely to be followed by drifting in summer. Summer working got rid of the rubbish, and allowed of the working of the fallow when it was wet. Too much land was worked dry, although sometimes it was practically the only way of getting rid of rubbish.

CONCLUSION.—By an error in our last issue Mr. C. H. Smith was said to have secured first place with the cultivating plough in the field trial held at Eureka. The report should have read:—"Cultivating Ploughs.—First place, Messrs. John Shearer & Sons; second place, Mr. C. H. Smith."—Ed.]

Davenport, September 7.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Roberts (chair), Bothwell, Holdsworth, Sanderson, and Lecky (Hon. Sec.).

AUSTRALIAN MERINO SHEEP.—Mr. Bothwell read the following paper:—"At no time in the world's history have the flocks and herds of any country increased to such an extent as in Australia. It is but little over a century ago that Australia imported her first sheep—a little flock numbering 29. The figures in the last official return place the present number of sheep in Australia at 91,678,281. Nine years ago (in 1902) the number was 53,608,347, but that was a time of drought, and Australia possessed then only half the number that she held in the record year 1891, viz., 105,421,168. The world's production of wool has not increased during the last 20 years, although the Australian output is growing larger year by year. This proves that the older countries are losing the trade to us. Why is the Australian wool the best? Because the Australian Merino grows the finest and most silky of all wools. The present Merino breed of sheep has been evolved from the short-woolled Merinos that were imported in the early days of Australia. The original Merino is of Spanish origin, described as a variety of sheep with fine, long wool. The early sheepfarmers recognised this hardy breed as a suitable sheep for Australia, and from the parent stock bred what is now known as the Australian Merino—a distinct type, much larger in frame, growing a close wool, fine in quality, and heavy in weight. As an instance of what can be done by careful breeding and by culling out inferiors, I know of two station-owners who held adjoining runs. The first had nearly double the number of sheep held by the second; but to compensate for this the owner of the smaller flock had all large-framed sheep of good type. He culled out all his inferior animals, and these had been eagerly bought by others to improve the quality of their flocks. At shearing time, although with only half the number that his neighbor had, he had about the same number of bales of wool, and being heavier and better it brought about 1½d. per pound more. The Australian Merino is so sought after that many prize rams go from this country to the United States, Argentine, and South Africa. The prices often range over 1,000 guineas, and some two years ago a ram brought 1,350 guineas. Wool-growing is a most suitable industry for Australia. The climate is so mild that sheep do not require to be housed in winter, and the natural pastures are so succulent that sheep do well without any artificial feeding. There is no doubt that within a reasonable distance of freezers it will pay to hand-feed lambs for export. I note that no less an authority than Professor Lowrie says that in the Australian States lamb-raising should be more profitable than in New Zealand. We are largely indebted to such breeders as the Murray Brothers, of Canowie, Booborowie, and other stations, for the class of sheep and quality of wool produced. The Merino is, without doubt, the most useful sheep, producing good fleeces and good mutton. If crossed with Southdowns, Dorsets, Leicesters, or Lincolns the lambs produced mature early. As runs, however, are usually at great distance from port of shipment, wool will be the chief aim of the producer. Do not buyers of wool attend our sales from all countries? England, America, and the Continent send their buyers, and lately even Japan has been represented. The cutting up of big estates has been deplored by some as tending to the degeneration of the Merino. Much as I admire the good qualities of the Merino, and acknowledge what it has done in bringing money into the country, yet when the land is required for the sustenance of human beings, the sheep must give way. There is one peculiarity with sheep, viz., that in-breeding does not cause degeneration of the species. Some of the most successful breeders have bred from the same strain for 70 years, and with a distinct improvement. As like begets like, all bare-bellied sheep and those that do not carry good fleeces must be got rid of to make room for better quality. Overstocking must be avoided. It is always best to keep the best class of stock that the breeder can procure. Good stock require more feed than inferior breeds, but one good sheep will produce a fleece of more value than two from inferiors. The Merino does not seem to thrive near the seacoast as well as it does inland. It is true that good wool is grown, but the sheep are of small frame. As proof that they do better inland, lambs born near the coast grow into big sheep when they are early removed."

Dawson, August 19.

(Average annual rainfall, 10½in.)

PRESENT.—Messrs. Meyers (chair), Wilson, Quinn, Baker, Hughes, and Nottle (Hon. Sec.).

FALLOW.—A profitable discussion took place on this subject. It was thought that fallowing should be commenced as early as possible, in order that the necessary time might be available for cultivating. Some members used the four-furrow plough for fallowing. Members agreed that 3in. to 4in. was quite deep enough to plough in this district; this depth would ensure a good seed bed. Nevertheless every farmer should use his discretion in regard to this matter.

Wepowie, September 9.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. Halliday (chair), Gale, Crocker, Rielly, Roberts, Knauerhase, Pearce, Hetzel, Crystall, J. and T. F. Orrocks (Hon. Sec.), and two visitors.

CULTIVATION OF THE SOIL.—Mr. Roberts read a short paper on this subject, in which he said it was necessary to scarify land in order to encourage the germination of rubbish. It should then be ploughed to a depth of 5in., and the surface worked fine with the aid of the scarifier or cultivator, sheep could then be put on to keep it clean. Land was better when left open and loose, and in order to attain this condition he favored the use of the cultivator after harrowing. In discussing the subject, Mr. Roocke said it was possible for one to overwork his land in this district, especially in a dry season. Mr. Pearce thought it advisable to leave the land rough until seeding. Mr. Crystall said it worked too fine, it worked out in ruts. Mr. J. Orrocks thought it a good plan to cultivate twice before fallowing.

Willowie, September 5.

PRESENT.—Messrs. Hawke (chair), D. L. and S. McCallum, Schmidt, Howard, Bristow, Tucker, Gray, Bauer, Foulis (Hon. Sec.), and two visitors.

WATER SUPPLY FOR THE FARM.—This subject was dealt with in the following paper by Mr. W. R. Greig:—"To provide the water supply for the farm in a district like this I prefer the dam, as there is considerable uncertainty in well-sinking as to whether fresh water will be struck. Before commencing to sink a dam a trial hole should be put down to a depth of at least 2ft. beyond that to which you intend sinking, to test the quality of the soil: otherwise you may waste a lot of time by sinking a dam 8ft. or 10ft. deep and then strike a gravel bed, rendering it useless. Dams sunk in the winter will hold much better when first filled than if sunk in dry weather, as the bullocks help to tramp the bank when scooping. I consider the ¾-yd. bell-mouth wheel-handle scoop, with rockers on, and a 5-cwt. single-furrow plough the best for dam-sinking on a large scale, though smaller scoops are more handy for smaller jobs where you cannot get a large team to work. Dennis's patent silt scoop is the best appliance for cleaning out dams, because it can be done when the dam is full of water. By cleaning the dam out in the spring and getting it full again with the late rains, you can have the full depth of water; and 3ft. or 4ft. of water in the bottom of a dam is worth a great deal at the end of a long, dry summer. A dam should be large enough to hold through a dry spell for nine or ten months and water a good number of stock. To do this the top measurements have to be from 30yds. to 35yds. wide and from 40yds. to 50yds. long, and 12ft. or 14ft. deep, with a batter of one in three. The inlet should be at one corner, so as to allow the water a longer slope to the bottom, to prevent washing. If it starts to cut out, stop it at once. If you allow a deep gutter to wash out the dam will empty very soon, as water leaks out much faster through a straight wall than on the slope, where the sheep have a chance to keep it well tramped. Stone paving or concrete faced with cement will make a splendid inlet that will stand a long time without washing out. If a dam is situated in a watercourse and filled by large floods, it is a good idea to have a trapdoor in the dam, so that you can shut it when full, and prevent sticks, silt, and any other rubbish from floating in after the dam is full. The up-to-date farm should have a windmill on the dam, as working stock will often go to the trough to drink in cold, showery weather when they would rather go to work thirsty than go to a boggy dam. It is also risky allowing mares heavy in foal to go to a slippery dam to water. Often, the loss of one foal would be more than the cost of a windmill and trough. With very little expense water could be piped to a garden or chaffcutter, where it could be used for damping down hay. Sheep should always water at the dam. In sandy country, where wells are a failure and there is no run for a dam, it is necessary to select a site at the foot of a rise and sink a large underground tank, spreading the clay that comes out of the tank on the side of the hill about 9in. or 10in. deep; if this is done

and the clay well tramped with stock in wet weather, and good gutters made to the tank, it will prove itself to be a good watershed and not so expensive as asphalt. When sinking a large underground tank a lot of the top dirt can be ploughed up and scooped out much faster than carted out in drays or wheel-barrows. I consider a large stone tank the best to have for water supply at the well, as well water will sometimes eat a galvanized-iron tank through in a few years. Galvanized-iron tanks are much cheaper, and will last a long time if kept well painted or tarred, if used in fresh water. Where you do not require these tanks up high, I prefer to build a ring wall of stone about 18in. thick and fill the centre with fine sand to the level. This makes a durable stand that is not likely to give way when the weight comes on it. A large size of steel troughing is the best for stock, as wooden troughs are likely to leak when filled after being left empty in dry weather awhile. It is better to have your dam or tank a little on the large side than too small." In discussing the subject Mr. Schmidt said he favored the well, as the water was always fresh and free from mud. Stock did better on well water. The windmill was superior to the oil engine for raising water. Mr. L. McCallum preferred the dam. He thought stock did better on rain water, especially when feeding on saltbush. There was less danger of mares slipping foals or bad effects through horses drinking when overheated if they were allowed to drink out of the dam. When a horse drank out of a dam his feet were in the water, which lessened the danger. Mr. T. Hawke stated that on station properties dams were not always put down where there was a good clay, but where there was a good catchment. If they did not hold well, sheep were camped in them.

Wilmington, September 6.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Jno. Hannagan (chair), Robertson, Farrell, Slee, Noll, Hill, Hoskins, J. G. and W. Schuppan, D. and S. George, E. J. and H. R. Gleede, Zimmerman, and Jericho (Hon. Sec.).

HORSE-BREEDING SOCIETIES.—This matter was dealt with in a paper by Mr. Robertson. The terms of the horse-breeding society scheme as outlined by Professor Lowrie, he said, are highly favorable to the stallion-owner with a tiptop horse. The farmer, for service to two mares, would pay £5 5s., but not receive a guarantee. The stallion-owner's total fees depend on the number of foals left, so that his profits depend on the attention he bestows on his horse. The object of the scheme is to increase the value of our draught horses, which means to increase their weight. Now, a farmer, in my opinion, does not require this very heavy draught horse, so the scheme appeals more directly to the horse-breeder, pure and simple. Of course, a farmer on a large scale could breed from medium and heavy draught mares to meet his requirements, and contribute to the market as well, provided the maximum of mares to the horse was not exceeded. If such a state arose, the lightest mares would naturally be left out. The scheme, in my opinion, is worth every consideration, and far preferable to the Government attempting the business on its own, thereby using the general taxpayer's money and competing with the farmer and general breeder.

SALVATION JANE.—Mr. Hoskins read a short paper on this subject. Wherever the plant grew on his land it choked out everything else. In a favorable season it grew to a height of 3ft. to 7ft., while stock fattened on it, sheep eat it readily when the leaves were dry, and it appeared to be a good fodder for milch cows. Once it took root it killed every other plant, more especially wheat.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, September 4.

PRESENT.—Mr. A. Jacobie (chair), Burton, Curtin, Thyer, Murphy, Ryan, Hamilton, Bartrum, Woodford, Cox, Petrie, Bartram (Hon. Sec.), and six visitors.

MANAGEMENT AND CARE OF AN ORCHARD.—Mr. Thyer read the following paper:—"In selecting land for an orchard one must study the nature of the soil, and, if possible, procure soil of a rich loamy nature, through which rain can filter, and if deficient in fertilising elements, clay, sand, and lime may be added with advantage. To achieve success

an orchardist must carry this out on definite and intelligent principles. Before setting to work in planting an orchard make sure what varieties of fruit trees are suitable for this district, and if any other orchards are near, make inquiries as to what fruit do the best. You can then be more certain of the varieties that will do well with you. The shape of an orchard should be oblong, longer from east to west than from north to south. With the former you get more benefit from the sun. Before planting see that your orchard is well fenced with wire netting, strong, substantial, and secure from vermin. In getting your soil ready for planting, my idea is to plough not less than 5in. or 6in. early in the season, as soon as the first rains set in. Then leave, say for a fortnight or so, to let in any more rain that falls, and also light. After this harrow over a couple of times both ways. When near planting time make the triangle, and mark out the whole of the selected spot you intend planting, and at each 20ft. or 24ft., whatever distance you intend putting your trees in, place a straight stick. When this work is completed you will know how many trees are required. All varieties of trees should be planted in rotation. When planting see you have selected the soil best adapted, say, for apples, pears, plums, peaches, and so on, and you will have no trouble in gathering your crop. An orchardist must have good knowledge of pruning, budding, or grafting. When times occur that your trees are not doing as well as you wish, the budding and grafting of other varieties of more profit will then come in. The care of an orchard is the very essence of success. Early in the season cultivating or ploughing is necessary, so that the soil is open to let all moisture in. The growing of weeds is good up to a certain time of the year, but they should be got under as soon as spring weather sets in. After this the cultivator must be kept going continuously until your orchard is free from every weed growing. Hoeing is another process. Trees require hoeing around at different intervals. It keeps the soil open and the moisture in. The care of an orchard demands all your thoughts and energy. When once you have your orchard well established you are on the way to success. There are many diseases and pests an orchardist has to contend with, and every precaution must be taken to keep these in check. Many orchards are ruined through neglect, but with care and energy these difficulties can be overcome. See that all your trees are making good progress, and if some are doing better than others the backward ones may need some nutriment to force them on. Trees from the time of planting until they begin to fruit should grow rapidly and make strong wood. Note if your trees are making good fruiting spurs." In discussing the subject members thought it preferable to fallow the land prior to planting, rather than ploughing it up the season of planting.

FARMING IN THE DISTRICT.—This was the subject of a short address by Mr. Cox.

Leighton, September 9.

PRESENT.—Messrs. A. McDonald (chair), J. Earle, R. and A. T. McWaters, J. McDonald, R. Fairchild, W. Gillett, S. Pearce, F. Finley, G. Pryce, W. Brabcock, and A. E. McWaters (Hon. Sec.).

PLACE OF THE FUNGI AMONGST PLANTS.—The Chairman read the following paper :—
 "Just as the higher animals are highly specialised—that is, are endowed with a variety of organs, such as brain, heart, stomach, and others, each with its own part to fill in the animal economy—so the higher plants are composed of different organs, such as leaf, flower, bark, root, each with its part to fill in the plant economy. In both animals and plants the tissues are made up of an infinite number of life cells, these cells being modified in various ways to suit the particular part to which they belong. In neither animal nor vegetable kingdom are all its members such highly complex bodies. In both cases we can go away down the scale meeting simpler forms all the way until we come to organisms which consist of just a single cell. Of course these cells can be seen only by the aid of a microscope. Some of them are so minute that 10,000 of them placed side by side would not measure an inch. While it is easy to distinguish animals from plants, when dealing with the higher forms, it is not so easy when at the other end of the scale. The distinguishing feature is that plants can get their food from inorganic matter, while plants must have organic material on which to live. The definition of organic matter is any substance that does or has formed part of the tissues of a plant or animal. A typical vegetable cell consists of a tough sac or bag enclosing a thin transparent jelly-like substance called protoplasm, in the centre of which is a slightly darker rounded mass called the nucleus. The whole is given a green color by being impregnated by a green coloring matter called chlorophyll. It is by the aid of the chlorophyll that plants extract their carbon from the air, their other constituents they get from the soil or water, and they are able to build up from these elements the highly complex organic compounds

which form their tissues. While this is true of the great majority of plants, there are two classes which have no chlorophyll in their cells. They are therefore unable to elaborate their food from the simple elements, and have, like animals, to fall back on ready-made food material for their sustenance. One of these classes is the bacteria, and the other the class to which rust, bunt, and smut belong the fungi. The fungi, although so deficient in this one respect, have otherwise all the characteristics of plants. They are not by any means all harmful, the harmless or useful ones, however, usually get their sustenance from dead organic matter, and are called saprophytic, while the harmful class live for part and sometimes all their lives on living plants. They are called parasitic fungi. The bunt of wheat (*Tilletia caries*) belongs to this class. If you take a bunt ball and crush it between the fingers it will be found to be full of a black powder, which has a greasy feel and odor like decaying fish. The black powder, when viewed under a microscope, is seen to consist of a mass of brownish spores. They are so small that a single grain of wheat will contain 4,000,000 of them. If these spores are kept in moist earth or on a wet surface for three or four days they will germinate. The coat bursts and a tube is protruded. When the tube has grown to three or four times the length of the spore it forms a crown, and on this crown is produced up to 10 rod-like sporidia. These sporidia will produce secondary spores of the third degree. When these secondary spores germinate they produce a tube of almost inconceivable fineness, and it is this tube which can find its way into the first organ of the infant wheat plant. Once within the plant the tube gathers its food from the wheat plant, ascends the stem as it grows, takes possession of the head when it is formed, and uses the nutrient material, which the wheat plant sends there, to produce its crop of bunt balls. Smut has a similar life history. The black sooty heads are seen on wheat, but are more common on oats and barley. The spores of this fungus germinate like bunt spores, and produce, like them, a whole crop of secondary spores. These secondary spores then produce the fine mycelial thread which finds its way into the tissues of the young wheat or oat plant in the same way as the bunt. The remedy generally used is bluestone, which is perfectly reliable. The weak point about it is that it retards germination, and in dry years this sometimes makes considerable difference to the crop. One is led to ask whether it is possible to get one's seed wheat sufficiently free from bunt spores so that it can safely be sown without pickling. On our farm we have sown wheat four years in succession under conditions that would favor the bunt if the spores were there, and the crop has been perfectly free from bunt balls. Our experience so far leads us to expect that if we carefully pickle our seed on the land from which we take seed for the following year we will be able to continue to sow our main crop without pickle of any kind. If it is possible at all to sow without pickling it can only be as a result of good pickling in the years before. By good pickling I do not mean the use of a very strong solution, but careful work to insure every grain becoming coated with the pickling solution."

Mount Bryan East, September 9.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. Thomas (chair), B. and W. Dunstan, Gare, Best, F. and R. Thomas, Doyle, Hughes. W. and G. Quinn (Hon. Sec.), and one visitor.

HANDLING AND SHEARING SHEEP.—The following paper was read by Mr. W. Quinn:—"Preparatory to being shorn sheep should be driven quietly from the paddock to the wool shed. It is advisable to have a good sheep dog when handling these animals. At times a good deal of trouble will be experienced in getting them into the shed. A very good plan is to catch one, put a rope around its neck, and lead it into the shed. This very often induces the others to follow, and saves a good deal of labor and trouble. It is not advisable to crowd your shed at night. If you do this you will have losses by some of the sheep getting down and being smothered. I have seen as many as four large wethers smothered in one night by this means. Shears when taken out of the box are very rarely in proper order for work. They require a little alteration. First you will need to place the handle perpendicularly in a vice. Then a piece of bag must be put around the blade towards the point, and pull the blade back a little, both blades must be pulled back alike so that the points will be left about a half an inch apart. Then file the knockers well down, and get two corks and insert them inside the handles and tie them tightly up against the knockers. This prevents a great jar on the wrist when shearing hard sheep. The blades should run closely together, this prevents them from drawing in the skin and cutting

the sheep. The blades need a little cramping at the handles so that the points will not stick into the skin of the sheep and make them restless. The Turkey-stone should be rubbed flat on the inside of the blades when you are backing the edge up. Always use a fine Turkey-stone and keep it well oiled. Shears should be well ground. When you finish your sheep dip the shears in the waterpot, and give them a wipe with a piece of wool. This prevents the Turkey-stone from getting yokebound. This is very important, as you will never get a nice edge with a dirty stone. When catching the sheep to bring on to the board to shear do not catch it by the hind leg; this very often injures the sheep. Put your arm under the breast of the sheep and upend it. Then catch the forearm with your left hand and you can draw the animal nicely on to the board without exerting yourself too much. After setting the sheep up put the two forelegs behind your left arm, then commence the operation by cleaning the brisket. Run both blades under the fleece straight down to the flank, that gives you a clean go to take off the belly; the belly should be pulled off on the opposite side with the left hand. This prevents cutting into the fleece, which is a very important matter in shearing, as cutting up into the fleece gives trouble when manufacturing the wool. After removing the belly clean the breach and the inside of both hind legs. Continuing on you clean the near hind leg back to the flank right down to the tail. When trimming the legs see that the heels of the shears cut well, as the legs look much nicer when taken off with a good long cut. It does not matter how well a sheep is shorn on the body, it will never look nice if it is not trimmed nicely about the points and head. When going up the neck, which should be done after cleaning the hind leg, do not put your shears in on the shoulder but keep them well under the throat. By doing this you save some of the best of your wool with your fleece. I have seen some shearers strike in at the back on the shoulder and come out between the horns, which is a great mistake, as the neck wool very often breaks off and goes in with the pieces. If the under part of the neck breaks off it does not matter so much, as it is the coarsest wool on the fleece; take a good long even blow, not too wide. Do not get into the habit of coming back to trim off buttons and ridges, as this is loss of time and wool. Shear a little up towards the back when going down the first side, and be very careful not to cut up into the fleece at the back, as this is the most dangerous place for doing that. When you get down to the tail shear well over the rump, as this saves trouble when finishing off. After clearing the tail take a few blows up the back to clear the backbone, "then you have a straight run down the last side, finishing up with a good sweeping blow along the hind leg. When the operation is finished, both sheep and shearer should be clear of the fleece."

Redhill, September 5.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. F. Wheaton (chair), Cox, Coffee, P. H. and F. A. Wheaton (Hon. Sec.).

FALLOW CROPS.—This subject was dealt with in the following paper by the Hon. Secretary:—"In introducing this subject for discussion, it must be admitted that fallow crops cannot be countenanced unless conditions are sufficiently favorable to insure the growing of these crops successfully. For example, crops like maize and sorghum require a warm climate with a large rainfall when being grown for grain, but in a district such as ours these crops can be grown to advantage as forage crops with a rainfall of 18 in., providing that the summer rains are fairly good, and for this reason the above-mentioned crops are called summer growers. The importance of fallow crops lies in the fact that land now costs an abnormal price, and something will have to be done in the way of making better use of the land, i.e., instead of growing one crop in two years two will have to be grown. A crop that is likely to suit the district is maize. This crop will grow a large bulk of greenstuff when other feed is scarce. It is admirably suited to cattle, and also makes a good ensilage. The necessary cultivation for the growth of maize is as follows:—Plough the land fairly deep in June or July; work down to a fine seed bed ready for spring sowing. Sow 20 lbs. to 40 lbs. of seed per acre in late August or early September. It is best to sow in drills 30 in. to 36 in. apart, so as to admit horse hoeing during the growing period. If sown too early the severe cold may stop the growth. Sow the seed 1 in. to 2 in. deep. The crop will grow till January, and should receive during that time four or five horse hoeings. As to manures for maize, the crop responds better to heavy dressings of farmyard manure than to any other application, and maize does not lodge. Apply up to 20 tons. If using artificial manures, the soluble phosphates are best. Up to 30 wts. per acre are needed for a good crop. To harvest a forage crop of maize, the best method is to throw it into a silo, as the bulk of the crop is ready at one

time. It can be either grazed or soiled, i.e., cut and carted off. Grazing is rather wasteful, and soiling is expensive, but at the same time very little is lost. Maize is suited to any soil, providing that rainfall and heat are sufficient. The best maizes for this district are Ninety Day and Horse Tooth. The disadvantage of growing maize, however, is that there is not sufficient time to prepare the land for the succeeding crop. Now we come to sorghum. This crop does better in light soils, and will stand more severe droughts. It will not grow so much bulk of greenstuff as maize, but under favorable conditions will grow a second and third growth, while maize will grow practically nothing. Sow 4lbs. to 6lbs. of seed per acre. The cultivation necessary is similar to that required for maize. This plant, however, acts detrimentally on the succeeding wheat crop, and is said to be a poison owing to the presence of prussic acid, which develops whenever the plant has received a check, as in the case of a drought or a dry spell. This poison can, however, be avoided by not feeding to stock until the seeds have formed. The best sorghums are Early Amber Cane and Orange Sorghums. Another crop that might be grown to advantage is millet. It is like sorghum in every respect, and should be sown at the rate of 2lbs. to 3lbs. per acre. The best varieties are Hungarian, Japanese, and Pearl millet. Pease is another crop that might be grown successfully. This is usually a moist climate crop, but owing to its short period of growth may be grown in a relatively dry climate. Its disadvantage lies in the fact that the crop is ready for grazing when there is plenty of natural fodder; but at the same time it is a good nitrogenous plant, thereby enriching the soil. The plant itself is a good fodder for sheep, and there is plenty of time to prepare the land for the succeeding cereal. The grain is one of the best of fodders for topping off pigs for market, and also makes a good nitrogenous food for mixing with other substances for other stock. When used for ensilage it is generally used with a cereal. Pease is best suited to light soils rich in lime. The land should be broken up early, and worked down into a fine and clean seed bed. The best time to sow is early July, so as to miss most of the frosts. Sow 1½ bush. to 1½ bush. per acre in drills 8in. apart so as to crowd out weeds. The crop may be harrowed when 3in. or 4in. high without any harm being done. If growing for fodder, sow early, as early autumn peas make stronger growth, but the flowers are not so good. Therefore, if for fodder, sow early; if for grain, later. When growing peas for grain, the best method of harvesting is as follows:—Mow the crop when ripe, put through chaffcutter, and then winnow it. This leads to a certain amount of splitting and cracking, but as the grain is used mostly on the farm this does not matter. Pea straw is very valuable as farm fodder. Peas are sometimes ploughed in during the flowering period as an organic manure. Best varieties of peas are Partridge and Prussian Blue. The pea crop is free from diseases, although it suffers from caterpillars, aphids, and other insects. There are various other forage crops that may be grown in this district as fallow crops. In these are included rape, mustard, and kale. Kale is a biennial in moist climates, i.e., grows one year and flowers the next. A kale crop is a good preparation crop for wheat, as it cleans and enriches the soil and subsoils the land by its strong tap roots. Rape may be grown to advantage for topping off lambs for market, but at the same time the quality of the meat produced is not so good as that produced from kale or grasses. The chief advantage of growing mustard is that it can be sown in autumn for very early feed, fed down in August, and so giving a spell to grass paddocks, and then can recover from winter feeding. I have only touched on these latter crops, as they would be included, strictly speaking, in forage crops." In discussing the subject, reference was made to the disadvantage of growing maize and sorghum, as the crops required horse hoeing during the busy season. It was thought that in a district with a fairly heavy rainfall it would pay to grow a forage crop on fallows for two years, leaving the wheat crop a year later, but in a district such as this it was not advisable.

Whyte-Yarcowie, September 9.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Look (chair), Mudge (2), McCann, Wittwer, Pearce (2), Hunt (2), Robinson, McLeod, McGregor, Ward, Mitchell (2), and Jenkins (Hon. Sec.).

AGRICULTURAL AND VETERINARY CLASSES.—The following paper on this subject was read by Mr. Jenkins:—"The great advance in agriculture which has been made during the last few years is undoubtedly due in a great measure to more scientific methods being adopted by agriculturists. That being so, it goes without saying that if we are to continue to improve our yield we must learn all there is to know. We can best accomplish such a purpose by teaching our farmers something of the science of agriculture through

the medium of agricultural classes. Cannot such classes be carried on throughout the country by a staff of lecturers on some such lines as the wool classes? I feel sure such classes would be largely attended, particularly by our young men who are interested in agriculture, and by many of the older men also. How many of our farmers of to-day know, for instance, what chemical constituents are necessary for the production of a crop of wheat? And yet it seems to me that in the future we will require to know something more of the constituents of plant food than we do at present. If we would give our young men a scientific education we should send them to Roseworthy, which, it is said, is but poorly patronised by farmers' sons. But in these days of labor shortage farmers cannot afford to lose the services of their sons just when they are becoming useful on the farm. Therefore if we cannot send the pupils to the teacher, we must bring the teacher to the pupils. South Australia, being dependent on her agricultural resources, can well afford to appoint at least six lecturers to teach the groundwork of agricultural science. These lecturers could be stationed at convenient centres, and could form classes through the medium of the Agricultural Bureaus wherever a sufficient number of students could be got together to form a class. Of course fees would be charged for each quarter's instruction. Such classes would enable our young men to obtain an insight into the scientific side of agriculture, and once such an insight is gained and interest aroused, this can be followed up by home study of such textbooks as would be recommended by the instructors. Practical demonstrations could be given in hybridising wheat on plots specially provided for the purpose, and we would be enabled to see for ourselves the different varieties so propagated, and watch their progress under local conditions. Such a branch of practical instruction would be of great benefit, and would probably lead to many more farmers experimenting in this direction. I feel confident that if our Agricultural Department will make a move in the direction indicated it will meet with a ready response from the agricultural community, and would lead to considerably improved methods of agriculture being adopted, with corresponding gain to the prosperity of the State. *Veterinary Classes.*—That which I have written about agricultural classes will also apply to this department. It seems to me that this is really the solution of the question we have been discussing of late regarding the appointment of veterinary surgeons. What we really require is to be able to attend to the minor ailments of our own live stock. Veterinary instructors could form classes and teach us something of the anatomy of horses and cattle, and how to attend to them in their common ailments. Proper attention to mares at foaling time, how to dress severe wounds in horses, &c., and many other questions could be explained." In discussing the subject Mr. Ward said if wool classes could be conducted by lecturers, agricultural and veterinary classes, which were of greater importance to the farmers, could also be worked. Mr. McCann agreed that it inconvenient to send farmers' sons to Roseworthy. Owing to the scarcity of labor he could not spare his sons to go there. Mr. Pearce said the farmers' sons had the practical knowledge already; what they wanted was the scientific training.

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

Balaklava, September 9.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. R. S. Goldney (chair), E. Fisher, G. C. Neville, T. Lally, H. Roberts, W. Baker, H. M. Tuck, J. H. Traeger, F. W. Waegner, O. Uppill, J. Spillane, H. L. Twardz, J. P. L. Hoepner, and B. R. Banyer (Hon. Sec.).

HARVESTER v. STRIPPER AND MOTOR WINNOWER.—The following paper was read by Mr. E. Fisher:—"The harvester at the present time is fast replacing the stripper and winnower. The question is: Will it continue to hold the present position? A good up-to-date harvester properly handled by practical men is hard to beat; but otherwise the stripper and winnower will give the best results. Some of the drawbacks with the harvester are—(1) It gives relatively a dirty sample. (2) Working the machine when the grain is soft through dampness favors the germination of weevil. (3) It blows the wheat over the sieves on the land. (4) It costs more to keep it in order than the common

stripper. (5) It spreads weed seed over the land. (6) The chaff is lost. If the farmers had to store their own wheat, they would take this weevil question seriously into consideration. It is evident we have lost our pride in the world's markets for our wheat grains and samples. The common stripper—Firstly, will only reap the crop when it is in a fit state to be reaped; secondly, does not require the practical man that the harvester does; thirdly, requires little or no expenditure to keep it in order; fourthly, is of a lighter draught; fifthly, saves the chaff, and does not scatter obnoxious seed over the land. Ordinary strippers are made to-day to cut to a width of 8ft., and then they run lighter than a 6ft. harvester. Taking all things into consideration, I am inclined to think that the common stripper and motor winnower would give the larger farmers the most satisfaction. As the harvester is principally used to-day, should any person wish to see the poor cleaning of the samples, I would advise him to inspect them at the local flourmill; it would surprise him to see the quantity of rubbish that comes out of it. That is certainly no credit to the farmers." Mr. Neville agreed with Mr. Fisher in some of his contentions. When the harvester came in, some eight years ago, he condemned it, and said the stripper would come out the better in the long run. He was of the same opinion now. The trouble was that they could not get the labor to clean the wheat. The way things were going it would be impossible to get men to clean the wheat. Large quantities of wheat were wasted last year at Pinnaroo, and also in Victoria, because men could not be got to clean it. He had seen quite as dirty samples from the winnower as from the harvester. If they could get the labor to clean the wheat, he thought the stripper and winnower would supersede the harvester. Mr. Uppill did not think the matter of weevil in wheat was to be considered in the question of machines. No matter how it was gathered, if wheat was allowed to lie in the damp weevil would appear. With the present conditions of labor, the harvester was a great advantage. Mr. Tuck did not think the modern machines cleaned the wheat so well as the old ones. With the old ones they had time to see the rubbish coming through and could remedy it. They had not the same advantage with modern machinery. Mr. Roberts said the harvester got the wheat out of the way with less expense than the stripper and winnower. He did not agree with Mr. Fisher about the weeds being thrown on the land. In reaping, they only went low enough to take the heads off, and weeds were usually lower down, and they were left on the ground. Mr. Lally favored the harvester with the present state of the labor market. The harvester got the crop off quicker, and he thought the grain was just as clean as with the stripper and winnower. Mr. Hoepfer preferred the harvester in this district and with the scarcity of labor, though he thought the stripper and winnower were better in scrub country. Mr. Traeger said with the ordinary stripper wheat had to be drawn sometimes half-a-mile to the heap, which meant a loss of time. With the motor winnower several strippers could be kept going. For small farms he preferred the harvester. Mr. Waegner favored the harvester. He had a stripper and winnower in his shed, but his sons would not use them. Mr. Spillane thought the harvester was best for a small farm. The stripper and motor winnower would, perhaps, be best for a large farm. Mr. Twartz said the harvester was best in the level country, but in new country, where there were mallee shoots, the harvester could not be used. Taking labor into consideration, the harvester was to be preferred. He did not think the harvester was responsible for weevily wheat. The Chairman believed the weevil germs were on the grain, and developed where the conditions such as dampness were favorable. He could not see that it was due, necessarily, to the harvester. He had seen weevils develop in wheat which was perfectly dry when stored. His experience was that the wheat reaped with the harvester was cleaner and weighed heavier than that reaped with the strippers and cleaned with the winnowers.

Blyth, September 4.

PRESENT.—Messrs. A. L. McEwin (chair), Zwick, Schuster, Gell, Lehmann, Longroire, A. A. and J. C. Schulze, Vinnos, Coleman, Pedlar, J. S. McEwin, H. W. and W. O. Eime (Hon. Sec.) and two visitors.

HANDLING WHEAT IN BULK.—Mr. Lehmann dealt with this subject in the following paper:—"The present system of weighing wheat is unfair to the farmer or producer. The scales employed become worn and knocked about on account of rough usage and being continually moved from load to load of wheat. In windy weather, when it is impossible for the agent to weigh correctly, many pounds of wheat are lost to the farmer.

indirectly, and while the scale is turned to each individual bag there is another loss to the farmer. If the wheat was weighed in bulk or by the load the scales would only be turned to each load, and the farmer would no doubt gain as many pounds as he has bags on his load. The great trouble with the farmer who has a lot of wheat is to get it off quickly. If it was weighed over a bridge the agent could make out the cartnotes or payment while the load was being taken off by the lumpers. It would mean considerably less work for the agent, and would give him an opportunity of attending to the farmer's wants and supplies generally, without having to waste his time with each individual bag. The farmer's team would not be kept waiting while the bags were being weighed and marked. I hope that the Bureaus will take the matter up and approach the Government to get them to erect a few weighbridges at the most important centres. In view of the fact that a number of agriculturists are suggesting the adoption of the American system of dealing with grain in bulk instead of bags, a few notes on the subject may be of value. I do not propose to discuss the question as to whether the elevator system could be advantageously adopted in this State, but to refer to certain points which must be dealt with in discussing this subject. First of all we have the fact that the difference in the price paid by the farmer for his bags and the amount he receives when the bags are sold as wheat amounts to 4d. to 4½d., according to the respective prices of wheat and bags. For convenience of reckoning this may be set at 1½d. per bushel, or on an average crop of 20 million bushels, a total of £125,000. The main question for the farmer is, how much (if any) of this heavy outlay could be saved by the use of elevators, and although it is impossible to definitely answer this question, the fact remains that the cost of elevating and storing at the coastal elevators will approximate ½d. per bushel. The adoption of the elevator system would involve expenditure, amongst other directions, in the following:—(1) The erection of coastal elevators of considerable capacity at the principal ports, and of smaller elevators at, say, 20 railway stations. (2) The alteration of railway rolling-stock to carry wheat in bulk. (3) The provision of ramp platforms at railway stations from which wheat will be forwarded, to permit of its being loaded into trucks from the farmers' wagons by gravitation. (4) The alteration of farmers' wagons to carry wheat in bulk. (5) The provision of facilities for the transfer of grain at the break-of-gauge stations. It is not within the scope of this article to indicate how many and where elevators would be required, what they would cost to erect, what outlay would be involved in the alteration of some 2,000 or more railway trucks, or how the actual cost of handling in bulk would compare with the cost of handling in bags as at present. Taking the 1909-1910 crop as a basis of the quantity to be dealt with in this State, we find that out of a total crop of 25,000,000bush. about 16,000,000bush. was exported as wheat, and about 3,000,000bush. as flour. There is little doubt that the quantity of wheat handled at the country mills would not justify the erection of elevators; and the seed used by the farmer, and for home consumption, would not pass through the elevators; hence the quantity handled would amount at the outside to, say, 20,000,000bush. to 22,000,000bush. annually. In the United States the crop varies from 500,000,000bush. to 750,000,000bush., the greater part of which is used locally, being transported to different towns as required. The exports of wheat range from 4,000,000bush. to 150,000,000bush., according to the season. It is therefore practically impossible to make accurate deductions from a comparison between the methods adopted when such immense quantities of grain have to be handled, and those expedient in connection with our small crop. Another point we have to consider is that at only three of the ports in South Australia does the grain shipped exceed a million bushels in the year, while relatively large quantities are shipped from about eight other ports. This is one of the greatest difficulties which would have to be faced in the handling of wheat in bulk. We cannot overlook the fact that a large proportion of the wheat shipped from our chief ports reaches those ports in small coasting vessels from the many shipping places in the two gulfs and the West Coast, and while the facilities for shipping wheat from near-by outports have been a considerable factor in the profitable occupation of the land in the districts referred to, this coastal trade presents a serious obstacle to the adoption of the elevator system, as the vessels engaged therein could not be fitted up to carry bulk wheat. A further point to be considered is the fact that the wheat export is split up amongst a large number of firms, who would need to hold their stocks at each centre in a jointly-controlled elevator, as the interest on buildings and machinery and working expenses would not permit of the economic working of more than say two elevators at the three principal ports. The cost of the elevators will vary apart from the question of their size, according to the materials available, and cost of carriage. Country elevators in America, holding 15,000bush. to 25,000bush., cost from £500 to £600, with all necessary plant. Such an elevator could deal with a large quantity of wheat during the season. Many of the large elevators at the chief

trading centres hold over a million bushels, and the largest of these involves an outlay exceeding £90,000. Many other points would require consideration in connection with the proposal to handle our wheat in bulk, but the foregoing show that the solution of the problem is not so simple as some of our members appear to consider. At the same time the question is one that should be fully ventilated. The advantages of the bulk handling of wheat are undoubtedly great, but before the system can be adopted the difficulties referred to above must receive consideration."

Bowman's, August 10.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. Grigg (chair), T. and F. Smart, J. S. and J. Lomman, Applebee, Gale (Hon. Sec.), and two visitors.

ROLLING AND HARROWING GROWING CROPS.—Mr. Grigg initiated a discussion on this subject. He thought that in heavy land harrowing, especially if the crops were weedy, was much better than rolling. Mr. T. Smart said when a crop had been fed down by sheep, cultivation with the harrows, if the ground was fairly wet, improved the crop. Mr. J. Lomman would harrow the crop just when it was shooting. If it was on ground that was at all likely to drift, rolling was preferable provided the soil was moist. If it was dry he would not touch it. Mr. F. C. Smart thought harrowing was much more effective in destroying weeds. He had harrowed barley this year, which had greatly improved the crop.

Clare, September 8.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. D. McKenzie (chair), C. T. Jarman, J. H. Knappstein, A. Hill, S. Tuohy, J. Berridge, J. Dux, P. M. Daly, Evans, C. Neate, W. Pattullo, E. and G. Victorson, M. L. Nolan, F. W. H. Lee, A. Pycraft, E. H. Kelly, F. Pryor, C. J. Radford, F. Keane, F. S. Walker, C. Scott, J. Kollosche, and P. H. Knappstein (Hon. Sec.).

SOIL AND FRUIT TREES.—Mr. W. Pattullo read the following paper on "Soil and Fruit Trees, with Hints for Beginners":—"These notes are from my personal opinions, gained from my own experience, and my hope is that they may be of some service to beginners. *Apricots and Peaches*.—In first planting these I made a mistake in putting them in unsuitable soil. They were planted in a light loamy soil, about 4in. deep, lying on top of a very stiff clay subsoil. For the first six or seven years they did very well, but since then have hardly been worth while pruning. The next lot was planted in a strong stiff soil, with a limestone bottom. These have now been in eight years, and keep on improving every year, and bear large clean fruit. I think this is the ideal soil for this class of fruit, and would advise beginners not to plant these trees anywhere near clay. *Apples*.—My first apples were planted some 17 or 18 years ago on a very rich creek flat, and made any amount of wood, but were a long time before coming into bearing. As the soil rises from the flat it gradually changes to a lighter sandy loam, with the clay much closer to the surface. Here the trees, although they did not make nearly so much wood, bore fruit much sooner and more heavily than those on the flat, and were not nearly so subject to disease. My idea of the most suitable soil for this class of fruit is loose, rotten, slaty top soil, a good clay bottom, because the fruit is more even. I have had very good returns from Cleopatra and Jonathan trees eight years old. Beginners would be well advised to avoid wet flats or limestone ground for apple trees. *Pears*.—These will do very well on soil that would be quite unsuitable for apples. I have seen them growing and bearing well on poor, clayey, waterlogged flats, and would advise to plant these trees on the poorest and wettest part of their gardens. *Oranges*.—With the exception of apples, I believe as much money has been spent in planting oranges as on any other fruit in this district, and with very poor results. In my opinion this is largely through planting in unsuitable soil. My own oranges have done very well, but it was more through luck than judgment that I chose the site. They are planted on a creek flat, with a top soil of light sandy loam resting on a bottom of alluvial black soil, with good drainage into the creek. I have seen them do well in the South-East, planted in a loose top soil resting on a limestone bottom, and have thought of trying some on a somewhat similar soil here, so anyone having a suitable soil I would strongly advise to plant oranges, as in my opinion they are very profitable. The position should be well sheltered from wind. *Vines*.—Sultanas I planted 12ft. apart in the row. This was a mistake; 8ft. apart is quite enough, as in pruning new wood must

be left each year, and 12ft. is too far for the rods to cover. I would never plant sultanas on clay ground or rich black flats. I prefer strong top soil on limestone bottom, or a sandy loam on top of block alluvial bottom, but prefer the limestone soil, as the fruit is much larger, and when dried more weighty." Mr. Jarman, in discussing the subject, said he had had peas do well on poor badly drained land. He had a patch of soil from which salty matter was oozing. Pears and quinces were doing well on it, but no other trees would grow on it. Members thought Jonathan apples would grow and bear well on wet, heavy soil. Messrs. Victorsen and Pattullo both had growing on rotten slaty soil varieties of apples which were usually subject to bitter pit, but fruit from these particular trees was free from the disease. Apples growing on limestone soil were badly affected. Mr. Victorsen had prunes growing on slaty soil, which set heavy crops of fruit, but failed to ripen them. Prunes growing on wet, alluvial flats had yielded heavy crops.

Freeling, September 8.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. F. Heinrich (chair), Shanahan, Neldner, Leske, Mattiske, Neindorf, Koch, Bloch (Hon. Sec.), and three visitors.

SOUTH AUSTRALIAN FARMERS.—The Hon. Secretary read an interesting paper dealing with the efflux of young farmers to the neighboring States, some of which were offering inducements to them to emigrate. He quoted the opinion of numbers of prominent men in the sister States regarding the superior methods and work of the South Australian farmers as a whole. The hereditary hardness and general ability of the South Australian farmer made him a valuable unit, and the sister States did their best to tempt him to settle on their lands. Instances were then given to show that the enterprising men who had gone out into the back mallee country during more recent years were not lacking in stamina, but were worthy sons of worthy sires who in the earlier days subdued the then unknown Australian lands. With facilities in water supply and railway transport great things might be expected of the South Australian farmer for the prosperity of the individual and the State.

Gawler River, August 24.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. A. J. Bray (chair), A. M., C. A., and J. H. Dawkins, Dunn, Hillier, Rice, Leak, Winckle, Richter, Davis, Roediger, and visitors.

INSPECTION OF FRUIT GARDENS.—In the afternoon, the members, accompanied by the Horticultural Expert, inspected a number of orangeries and fruit gardens in the district. In the evening Mr. Quinn delivered a lecture on "General Principles of Pruning," which was much appreciated.

Mallala, September 5.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. Griffiths (chair), J. J. and W. McCabe, Konczag, Temby, A. V. and J. Nairn, Denning, and two visitors.

BREEDING DRAUGHT HORSES.—Mr. F. M. Worden read the following paper:—"That our climate is eminently adapted to horse-breeding cannot be doubted. Horses can be turned out into the open fields at all times of the year where they can get plenty of exercise and fresh air. With plenty of feed and water, and some shelter provided in the way of sheds or straw stacks, or even nice warm shelter belts of scrub, they need not trouble their owner very much. I am of the opinion that the horses on some of our farms are worked too hard and too long without a spell or rest. Sometimes our teams start regular work early in April. They are kept up to the mark pretty closely all through the seeding, and as soon as that is finished they are working on the fallowing, which may last till the end of July, or perhaps longer. There is very little breathing-time between the fallowing and cultivating. The ground covered by the plough will probably keep them going all the time, with very little break until the hay is ready, and sometimes our fallow has to be left in a very unsatisfactory condition for the hay season. I believe it will pay us to keep more horses to work our land instead of trying to do so much with one team of seven or eight." Such constant work on our farms in wet seasons is playing havoc with our

aged horses. Horses of 15 years or even 20 years of age will do a lot of work if not worked too hard and constantly. When so treated they get leg weary and sluggish, fall off in condition, get sore shoulders, and if hard driven in that condition lose their vitality. If we are going to keep more horses we must see that there are other means of getting some remuneration for the outlay of capital and the feed they consume, in addition to the work. In order to do that we cannot do better than keep a large percentage of brood mares. I do not mean that these mares are to be kept in idleness, on the contrary, they are capable of doing their share of the work with the geldings until within two or three weeks of foaling. I would keep two mares to one gelding, and not have them all to foal at the same season of the year. Foals can be reared successfully if dropped in February or March, or early in April. I have two March and April foals ready to wean. They and the mares are looking well, when taken away from the mares they will have plenty of grass. Avoid, if possible, working a mare hard when she has a young foal at foot. Half a day when the foal is four or five weeks old, if the mare is fed well would not hurt her or the foal. A mare carrying a foal is better when working if in good working condition. When kept in idleness, they get too fat and often give trouble at time of foaling. When selecting mares for breeding purposes, above all things look for soundness in the legs and feet, it does not matter how nice a body a mare may have, if the feet are unsound you are likely to have a lame horse. A horse with a ringbone, or side bone, spavined hock, no matter how strong and well built elsewhere, is something like a strong chain with a defective link, it is no stronger than its weakest link, and so a horse with the defects mentioned is not much stronger than its weakest point. Such defects will be passed on to her progeny. Young mares, fairly short legged, with about 10 in. of bone, clean and flat, with a nice lot of hair and muscle, and active, should be purchased. These will cost about 100 guineas each. Of course, all of us may not be able to go into the market straight away and purchase a half a dozen mares at that price; but we could move steadily towards that end. It would be necessary when the youngsters came along to provide for them during the winter by sowing barley or something similar that would be likely to give a good supply of green feed in the season. Next to good breeding comes good feeding. If these suggestions were adopted we should have more strength with which to work our land, get over more of it whilst in working condition, and our horses would last longer and keep in better condition. We should have more time for odd jobs about the farm, and the mares would be turning in a handy little income as well as keeping up the strength of our teams by providing stock to take the place of those that cannot work any more."

Northfield, September 5,

(Average annual rainfall, 19 in.)

PRESENT.—Messrs. Williams, Kimber, Roeger, Goldney, Kelly, Rowe, Westphal, Wright, Mitchell (Hon. Sec.), and one visitor.

DRILLING WHEAT.—Mr. Rowe submitted a paper on this subject, in which he pointed out the necessity for the thorough cultivation of the seed bed prior to sowing. It was advisable to adjust the drill so that it would make a shallow groove in the seed bed, in order that the seed and manure would be together. After a first general downpour of rain in early April, when waiting for a second fall, cultivation to a depth of from 1 in. to 2 in. was advisable. Where there was stinkwort, or hogweed, he had used a hoe drill. By drawing the keys from under the springs the tension was put on the hoe. He had found drilling wheat to a depth of 2 in. to 3 in. quite sufficient, and where the seed bed was near the surface, a less depth was required. When the crop was for hay, and there was a doubt as to whether the wheat would malt, a bush. of oats to the acre went a good way towards filling in the blanks. If the earth adhered to the hoe, there was little danger of the wheat malting.

Salisbury, September 5.

PRESENT.—Messrs. Moss (chair), Laurie, McNicol, E. V. and H. H. Harvey, Tate, Goodall, Frost, Bussenschutt, Whittlesea, Short, McGlashan, Shepherdson, James, Powell, Evers, Coher, Neal, Judd, Jefferies, Jenkins (Hon. Sec.), and three visitors.

MILK PRODUCTION.—Mr. Shepherdson read a paper on this subject. The three essentials of milk production he characterised as—a fair area of good grass land, a sufficiency of suitable labor, and a herd of good milkers. "You can buy cows in the market," he

said, "at less cost than is required to rear them; but my experience has convinced me that not one-half of the cows so purchased are worth their keep. I find the most reliable way is to rear them from the best and only from the best. If two generations have been good you have no need to doubt the third; and when you get a few that are really good you can soon work up a good herd. I pay but little attention to breed; I rely almost wholly upon performances. I care the least for the Jersey, as I have found them timid, nervous, easily upset, and dainty in their feed, and often cause trouble at milking; but, no doubt, their milk is richer than others. Care should be taken to prevent heifers breeding when too young, as this is one cause of so many stunted specimens that one sees. I maintain no heifer should be in milk until 2½ years old, and if 3 years of age all the better. All cows should be dry at least a month before calving, and if they get two months' rest they generally do better next season. A bull of a good milking strain should be kept, but not allowed to run with the herd, as you require your cows coming in at regular intervals so as to ensure a regular supply all the year, as irregularity of supply is the greatest trouble to the retailer. If cows are to yield well they must have plenty of good and suitable feed, and to provide this at all times of the year is the greatest difficulty a producer has to contend with. In the spring months there is usually an abundance, but as soon as summer arrives the trouble begins. The most reliable fodder plant for the summer is, undoubtedly, lucerne, and this can be successfully grown on these plains with proper care and attention. It is, indeed, a splendid fodder for milk production, and it also makes the very best of hay for milking cows, and is far superior to any wheaten or oat hay; but its chief value consists of providing green feed for the cattle when everything else is dried. Whenever the crop is good enough it should be mown and fed to the animals regularly. By this method it will yield a far larger supply of fodder than if grazed. But it often happens the crop is not good enough for mowing. Then you must resort to grazing it. A much larger area will be required, and it must be subdivided into three or four paddocks and grazed in rotation. They should be so small that the herd will eat the crop bare in about 10 days. By this method the lucerne will thrive much better. Great care is necessary in doing this, however, or losses will occur through blowing, especially if there has been a good fall of rain a week or so before. I have known cattle die within an hour of being turned out when they have been only about 40 minutes in the lucerne. When the lucerne is cut and fed to them there is no need for fear. All lucerne paddocks should be dressed with manure in the winter, spared in the springtime, and then mown for hay about the middle of October. If he has plenty of this there is no need whatever for the farmer to buy bran. When bran costs over a shilling a bushel, as it usually has during the last few years, it is too dear for milking cows. The farmer must not rely upon maize or sorghum, as they rarely do any good unless watered. Some very good crops of mangolds can be grown by selecting choice patches of land, but they entail a considerable amount of labor. They are a splendid food for milk cows, and for quality of produce they excel even lucerne. It is also a good plan to have an acre or two of well tilled and well-manured land near the homestead, which should be sown immediately after the first rains with a mixture of Cape barley and a very early wheat, say, King's Early. This will often grow very fast and yield a good out of splendid fodder before there is much natural grass in the early winter. This is much relished by cows before it gets into head, and is of great value in seasons similar to the present one. A producer may take all these precautions and yet times of scarcity will occur. To meet these the best thing I know of is a good stack of wheaten or oat hay, or mixed for preference. A great many of the crops are left standing too long before being cut; in fact, I have seen them standing until yellow with grain. Now, this hay may be good feed, when chaffed, for young working horses; but for milking cows it is very poor stuff indeed. In the winter, when nights are long and cold, the cows should be turned in a paddock where there is good shelter; there is nothing better than a prickly acacia or boxthorn hedge for this purpose. The animals should be fed with hay if the grass is not good. This is easily done and with very little waste if the hay is scattered on the clean grass. It keeps them in strength and prevents scouring. They are then much cleaner and pleasanter to deal with at milking time. I make it a practice to give them hay as long as they will eat it, and I believe it pays to do so. A producer should scarcely ever be without a stack of hay, as I look upon it as an insurance against starvation. We have heard a great deal these last few years about sheds and buildings for milking cows. I know it costs money to buy materials and a lot of labor in erecting, but I feel that in a few years they will repay the whole of that cost in the saving of time and prevention of waste in feeding, ease, comfort, and quickness in milking, and cleanliness and protection from the weather for the milkers. All buildings should, if possible, be on an elevation, so as to secure good drainage. If a naturally raised site is not to be had it would be better to raise one; otherwise it is a

continual source of trouble if the position is flat or low. In all milking sheds provision should be made for feeding, and this should be done from the head, as it is far more convenient and saves much time. A good manger is easily made with suitable timber and plain galvanized-iron, which is the best and is easily kept clean. There should be plenty of stalls; in fact, it is desirable to have a stall for every cow, and then at milking time each cow will walk into her place. Another advantage of this is that the cows are dry while you are milking. It is very disagreeable and improper to be milking while water is running from the cows back on to your lap and sometimes into the bucket. If all are bailed all this trouble is prevented, and milkers can keep dry and clean in all weathers and will complete the milking much sooner than if they have to fetch each cow in as wanted. Each cow gets what feed you give her, and cannot rob or gore her neighbor. With a square yard and sheds on two sides, open to the east and north on account of the weather, with the corner used for emptying buckets, there will be less running than if the stalls are in one long straight row. If you have room for only, say, half your herd, have them to come in one way and pass out the other, so that those milked are separated from those which have not been milked. The question is often asked: will it pay for a man to give all this labor, trouble, and expense to cows? I say, unhesitatingly, it will; as by keeping only good cows and feeding well a return of £13 per cow per annum can be made in a good season. It takes from four to five acres to keep a cow well. The land would be greatly benefited by being grazed frequently or for several years. Much better crops of hay will be produced afterwards. Only keep inferior or troublesome cows long enough to get them fat; then send them to market. Never overstock your land. There is more profit and less trouble with five cows well fed than in seven half starved. Every year topdress some of your grass land. It improves both the quality as well as the quantity of the pasture, and greatly improves its carrying capacity. Provide shelter in winter and some shade for summer. Nothing is better than a few gum trees for shade; this is very much neglected by many people. Have a paddock fenced away for dry or young stock. Milking should be done as quickly as possible, consistently with thoroughness and gentleness to the animal, and, as far as possible, in silence. This is the main trouble with children milking. Nothing is gained by having a lot of dogs about a milking yard. A frequent change of pasture is very beneficial. Do not allow your cattle to run in any paddock while it is very soft and boggy as it greatly injures the growing feed. Milking is work in which the labor of children can often be turned to very profitable account, and which, if not carried to excess, will do them no harm. Following it upon those lines a man can make a very fair success in this district; but, like all other occupations, dairying has its disadvantages. First, it is extremely trying and affords but little opportunity for holidays, and it has to be attended too in all weathers. It also occasions considerable labor and expense in fencing, by subdividing the land, and the wear and tear of fences is far greater with cows than with anything else."

YORKE PENINSULA DISTRICT. (TO BUTE.)

Arthurton, September 5.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. J. Welch (chair), Lamshed, Rowe, Short, Westbrook, Lamshed, Bull, Howlett, Collver, Nicholas, Stephenson (Hon. Sec.).

SOIL MOISTURE.—Mr. W. R. Stephenson read a paper to the following effect:—"In South Australia the seasons are spasmodic, and we are more likely to suffer from want of moisture than by having too much of it. It would be very difficult to lay down any hard-and-fast rules in relation to cultivation in any part of the State, but generally speaking it will be found that moisture is preserved by thorough cultivation. The nature of the land in all cases must be considered, and on almost every farm there will be found a variety of soils, and what is suitable for one part of the farm is unsuitable for the other. Where the soil is heavy and of a fair depth, plough deeply; but where it is light and rubbly do not plough deeply. The time to commence ploughing is very important. The practice followed in this district is to commence as soon as the seeding is finished, and there are many advantages in this method. When the winter rains have set in the land is in

the best condition for the plough, and the horses having been well fed are in good heart to do the work. Therefore, all things considered, it is wise to start the plough early, and as soon as possible break down the soil with the harrows. 'Get as fine a tilth as possible. If the harrows do not break it down sufficiently fine, put the roller over it. By so doing all noxious weeds will germinate and the land can be easily cleaned.' Whether to plough back or use the cultivator must be determined by common sense and natural conditions. In a wet season similar to last year, where a heavy growth of rubbish has sprung up, I would use the plough for the sake of getting the green stuff turned over, which will very materially enrich the ground for the following season; but under ordinary conditions I prefer the cultivator. But the question arises, 'What has this to do with the retention of moisture?' It has everything to do with it. Unless these first principles are followed then the task becomes impossible. It is very common in this country to have a dry spell, even during the winter months. I need only remind you that during the early part of last month (August) the land became so hard that good work could not be done, and under such circumstances the plough should be stopped. 'Never plough the land when it is dry,' is sound advice. Personally I never feel satisfied unless the fallow is completed by the end of August; if done earlier all the better. Having followed the conditions I have laid down in order to secure a fine tilth, it will then be noticed that evaporation of moisture, drawn to the surface by capillary attraction, commences. To minimise this the harrows should be at work breaking the tubes. During the succeeding weeks, and before the hot weather sets in, the land should be constantly worked. It is by these methods that moisture is retained. We have all had sufficient experience of the evil effects of drought, and it behoves us to do our utmost to meet every contingency that may arise. To show that well-pulverised land has the effect which I have named I will quote from an article written many years ago by an English Professor of Agriculture. The writer says—'I am fully satisfied that one of the greatest drawbacks that many of our farmers have to contend with, as a general rule, lies in the fact that they do not cultivate, or at least prepare, their lands deep enough. Let us look for a moment at the advantages that might be expected to result from a deep preparation of the soil. In most parts of the country, and especially in the south, we look with fear and trembling for a severe drought in the summer. If it comes it cuts short our crops in proportion to its duration. Were we prepared to irrigate our lands by flooding them with water at will we could guard against any bad results from drought; but very few, if any, of us have had such an arrangement. We have directly within reach the next best thing to it, however, and that is deep culture. To give you a clear idea of this let us suppose we take 1,000 tons of soil and dry it in its packed state to thorough dryness. We next expose it for 24 hours to an ordinary summer's atmosphere. At the end of that time we weigh it, and find that it has absorbed water—If sandy loam, equal to 5 tons; if clay loam, equal to 7 tons; if stiff clay, equal to 10 tons; if garden mould, equal to 12 tons. We now take the same soil and pulverise it thoroughly, after which we dry it and expose it to the atmosphere as before. At the end of 24 hours we weigh, and find that it has absorbed water—If sandy loam, equal to 26 tons; if clay loam, equal to 30 tons; if stiff clay, equal to 36 tons; if garden mould, equal to 45 tons. These figures,' says the writer, 'have been arrived at by actual tests made by noted scientists, and they tell in plain words the story of how deep and thorough culture qualifies the land to stand the effect of severe drought. Deep ploughing, where the land is suitable, enriches the soil by preparing it for rapidly absorbing the rains that fall, charged with ammonia from the atmosphere and filtering the important fertilising elements on the land.' The above remarks were written from an English standpoint, but in my judgment they have an important bearing on agriculture in any country, and prove conclusively that extensive cultivation tends to retain moisture in the land.' An enthusiastic discussion followed, in which most of the members took part. Most of the members agreed with the main features of the paper. Mr. Nicholas was of the opinion that it was possible to pulverise the ground too much if done early in the season. Mr. Apin gave an address, in which he showed by illustrations how moisture filtered through the land, and also the natural laws of capillary action. He contended that the finer the soil the more moisture was retained, and also that "aeration" took place more freely under such conditions.

Kadina, September 2.

(Average annual rainfall, 15 in.)

Presented by Messrs. J. Malcolm (chair), R. Correll, A. Weidenbach, W. Westphal, J. N. Pedler, A. Paterson, R. J. Rose, T. Roach, and A. L. Speer (Hon. Sec).

CULTIVATOR v. PLOUGH.—Mr. R. Correll introduced a discussion on "Cultivator v. Plough for Fallowing." He said that in view of the fact that fallowing was now in full swing, the present was an opportune time to discuss the best methods of carrying out this work. With some, the idea existed that to have good fallow it was necessary to plough deep and early, and then to keep working the land as often as the weeds showed themselves. It was a frequent thing, however, to see fields ploughed up rough, and then left because the farmer has not had strength or time to get all his fallowing done before the season had passed. As a result the land in many instances got tough and came up lumpy and lay open, and instead of conserving the moisture allowed it to escape, and required extra strength to pull the heavy plough. This method of fallowing was one of the causes of take-all. He did not wish to claim that the method he was about to recommend was new, or that he was the originator of it, neither that it would suit all soils, but where the soil was shallow, light, or stony it was well worth a trial. He recommended that land should be fallowed in March; if there was enough stubble or grass to cause a fire to run over so much the better. Following this the ground should be gone over as quickly as possible with a cultivator with narrow shares; not deep, but so that any seeds lying on the surface will start with the first rains. As soon as seeding operations were over the cultivator should be again used on the fallow, going deep enough, keeping it harrowed close up to the cultivator to prevent the weeds transplanting. The great advantage of this system was that as soon as the fields were turned over and a fine tilth prepared it was ready to receive all the rains that fell, and sheep would run over the fallow and eat all the weeds that were left. Later on it might be necessary to use the cultivator again, each time going a little deeper and harrowing directly after, always keeping the soil as firm as possible. He recalled the fact that over 40 years ago, when working as a farm hand in the Marino district, where the soil was shallow and of a limestone nature, a Scotch farmer in the district never ploughed his land more than once in seven years, using the cultivator in the intervening period, and as a rule this farmer had the best crops. Mr. A. Paterson said that in the Jamestown district, where he had been spending a few months, it was the custom to plough to a depth of about 6 in., and he had heard of cases where they had ploughed to a depth of 9 in. He would like to have Mr. Correll's opinion on the subject of deep ploughing, also concerning harrowing after using the plough. Mr. J. N. Pedler said that the question introduced was not a new one. He had tried the system for about 10 years with very satisfactory results. The cropping of land every other year instead of once in three years enabled the system recommended to be carried out with comparative ease. Twelve to fifteen acres could be worked with the cultivator in one day. The character of the soil to be treated had to be taken into consideration. The cultivator could not be used successfully on heavy soil, but in shallow soil and on mallee land, and if the rubbish was close he considered the cultivator could be used successfully. He agreed with the opinion that the rough working of the soil in dry weather was one of the causes of take-all. Mr. A. Weidenbach said that he was acquainted with a person in the district who had not ploughed his ground for nine years, but merely cultivated it with cultivators, and the person had some of the best crops in the district. Mr. R. Correll said that the question of deep ploughing was one that had to be decided by the nature of the soil which had to be worked. It would not do to plough land in the Kadina district to the depth that it was ploughed on Gren's Plains, for if they did it would mean ruination. He would recommend that the harrows be used after the plough as well as after the cultivator.

Maitland, September 7.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. Opie (chair), Bawden, Bentley, Heilemann, Hill, Jarrett, Lutz, Smith, Tossell, and Pitcher (Hon. Sec.).

BULLOCKS v. HORSES.—The question as to whether bullocks were more suitable than horses for the farmer who had only limited means at his disposal, was introduced by Mr. Bawden in a short paper. He thought a team of eight bullocks more suitable, as a team of say five horses and harness would cost approximately £195. A first-class team of eight bullocks could be purchased at £10 per head, with the necessary tackle. While the horses would plough more in a given time than the bullocks: there was also the fact that feed would have to be purchased for the former, whereas the bullocks would subsist on what they could find. They did well on salt bush, buck bush, blue bush, and many other rough fodder plants that horses would not touch. The accidental loss of an animal in the case of the horses would be much more heavily felt than with the bullocks. When it came to drilling, horses were necessary, but it would generally be found that a neighboring farmer would drill in the bullock-owner's crop, in return for post carting or haulage of wheat.

WESTERN DISTRICT.

Elbow Hill, September 2.

PRESENT.—Messrs. F. Freeth (chair), A. Chilman, E. Wake, and G. Wake (Hon. Sec.).

CO-OPERATIVE SHEEP SHEARING.—A discussion took place on this subject. Members did not favor the use of the machine for shearing, as they considered it retarded the growth of the wool. The Hon. Secretary said shearing could be carried on for a period of two months without danger of damage by grass seeds.

COST OF PRODUCING A WHEAT CROP.—The Hon. Secretary read a paper in which he estimated that the cost of producing, harvesting, and bagging a crop in this district worked out at 31s. per acre. Provision was made for the following expenses in making the calculation, which covered a 500-acre farm:—Hay and bran, 70 tons at £3 10s. per ton, £245; bran, oats, and pollard, £50; Manure, 15 tons at £4 10s., £75; cornsacks, 1,500, £35; seed wheat, 375 bush., £65 12s. 6d.; ploughshares, £5; oil, £5; twine, £6; wages—one man 12 months £80, one man six months, £40, self, £80; depreciation on working plant, £30; keep of men, £60; interest on capital value of land, £60; making in all a total of £776 12s. 6d. Members were somewhat surprised at the cost of producing a crop. It was thought that the allowance for labor should be increased from £200 to £260.

Green Patch, September 11.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. Gore (chair), Chapman, Freeman, J. Sinclair, sen. and jun., R. and P. Sinclair, McFarlane, and Whillas (Hon. Sec.).

DAIRYING.—The following paper was contributed by Mr. Gore:—"The dairying industry is one that should commend itself to farmers in this district. The reason so many cows are kept at a loss is that good milkers are hard to get, and farmers generally do not give the question of systematic feeding and plenty of good water the attention it deserves. For this district, with its wet and cold winter, I prefer the Shorthorn or the Jersey-Short-horn cross, the pure-bred Jersey being too fine to stand the long winter weather. In making a selection it is essential that a good milking strain be secured, and mated to a pure-bred bull, and only the most promising heifer calves raised. Persons having only ordinary cows can improve their herds by using pure-bred sires of accredited stock. I am quite aware of the fact that it is a difficult matter to keep a good bull inside one's fence, but it is a much bigger contract to keep a mongrel outside. The question of feed is an important but somewhat difficult one. To depend on native grasses solely is only to court failure and disappointment. Both summer and winter fodders must be grown for successful dairying. A few acres of thoroughly worked fallow should be in readiness for sowing rape immediately after the first $\frac{1}{2}$ in. of rain in the new year. A similar plot should be sown with rye or barley; rye is to be preferred, as it grows quicker than barley. For summer crops nothing succeeds like maize, which can be sown at intervals from November to January, provided the land has been well worked to retain the moisture. I also advocate sowing sorghum at the same time, for the reason that it remains green long after maize has dried off. I cut a very fair crop of sorghum right up to June this year. On rich black soil kale transplanted 3ft. apart gives excellent results, the under leaves being hand-stripped as the plants grow. With root crops the mangold is best, the Long Red being the heaviest cropper. It also produces a heavy top, thereby providing a large amount of green feed. The removal of the lower leaves tends to stimulate the root. The Giant Half Sugar, a new variety which originated in France, is sweeter than the ordinary mangold, of excellent feeding quality, and also a good cropper. The Yellow Globe, though much smaller, gives good returns in rich soil. The mangold is extensively grown in Denmark, one-tenth of the land being planted with that crop. A few small paddocks should also be sown down to grass for grazing. I have had fair results with a mixture of lucerne, cocksfoot, paspalum and Yorkshire Fog. I have tried others, but these so far have done best. A plentiful supply of green fodder during the summer months is a preventive of dry bible. With absolute cleanliness and care in the production of butter of good quality dairying in this district should be a payable industry." The writer of the paper exhibited some fine samples of mangolds and other roots. He had proved dairying to be very profitable in the district.

DRY BIBLE.—Mr. Freeman related his experiences with dry bible in the Penong district. For eight years he had found it impossible to keep a cow alive for 12 months; they died

within three days of contracting the disease. It was found that cows watered on mineralised well water escaped the trouble, whereas those which were watered on fresh tank water died within a year.

Miltalie, September 9.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. J. P. Story (chair), J. W. and E. Story, W. G. and E. P. Smith, A. and J. Ramsey, G. Kobelt, Jacobs, Laffin, Wilson, Hier (Hon. Sec.), and three visitors.

CARE OF HORSES.—The following paper on this subject was read by Mr. J. H. L. Ramsey:—"In a country like South Australia, where horses play such an important part on the farm, it is necessary that the utmost care should be bestowed upon the animals; otherwise owners cannot expect to utilise their services to the fullest capacity, and to secure the highest return for the money spent upon the purchase. The most important thing in the care of a horse is the feed and water. A horse should be fed four times a day when working, and he should not be given more than he can eat at once. It is a mistake to throw feed in the manger and not trouble to clean it up. To feed a team of eight horses properly would cost £7 8s. 6d. per week. A team of eight horses will eat about 1 ton of hay chaff weekly, and the cost of chaff per ton here is on an average about £4. A horse working should have 1 gall. of oats and ½ gall. of bran three times a day. The cost of oats is 7s. 6d. a bag, and bran 1s. 4d. a bushel. Of course a farmer who grows his own feed can manage more cheaply. Water should be accessible at all times, otherwise horses should have a drink before meals. The next important thing is a good warm stable with plenty of ventilation. When breaking in a young horse he should be well mouthed. The work should be light but constant. The best time to break in a horse is when he is two and a half years old. He should not be worked too hard until he is five years old, otherwise one is likely either to stunt the growth of the animal or pull him out of shape. When putting the collar on see that it fits properly and is not too big. He should be handled as quietly as possible, and by all means be taught to tie up. A farmer should breed his own horses, and to do this the best mares should be kept for breeding. The farmer should breed no more foals than he can feed properly. He should patronise the best entire obtainable. The best kind of horse for farm work is a thick, low built animal. He will stand the travelling, and will not eat so much feed as a big, clumsy horse. An important consideration in working a horse is to see that he does not get sore shoulders. When getting a horse in from the paddock, after he has had a long spell, do not put him straight into the work. He should be fed for a few days, and given a little light work to start with. His shoulders will soon get hard, and he will soon do his full amount of work. A simple but good remedy for a sore shoulder is blacklead mixed with a little grease and rubbed on the sore before putting the collar on. If the horse is at all touchy it may be wise to rub it on the collar where the sore touches. If the sore becomes swollen, medicated oil is good. A horse should be groomed once a day at least. A brush is the best to groom with, as the comb is very rough in wet weather unless great care is taken when combing. When a horse becomes sanded, he should be given pollard gruel mixed with chaff and bran. Its effect is to carry the sand gradually away. It is worth remembering that a horse will live for a week without food or water. A good remedy for a horse when he has eaten a large quantity of wheat is to drench slowly with 4ozs. of washing soda. If administered sufficiently early this will prevent the grain from being digested." In a discussion which followed, it was recognised that the farmer who grew his own hay and oats could feed his horses at a much less cost than the man who had to purchase feed. The opinion of members was that at the present cost of horse feed it would cost not less than 1s. per day per head to feed horses properly.

BULK HANDLING OF WHEAT.—A considerable discussion took place on this subject, and although one member dissented, a resolution was passed expressing the view that the Branch was not in favor of the Government establishing plants for the bulk handling of wheat.

Penong, September 9.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. H. Grad (chair), J. Stiggants, P. Farrelly, W. Saunders, J. B., G. H., and J. Oats (Hon. Sec.), and two visitors.

A CRITICISM OF FARMING METHODS IN THIS DISTRICT.—A paper to the following effect was read by the Hon. Secretary on behalf of the writer, Mr. G. R. Luff, who was unable

to be present :—" As it is interesting to most of us ' to see ourselves as others see us ' it occurred to me that a record of my impressions would be of interest to you. I cannot boast of a very extensive knowledge of local agriculture, as I have only been in Australia about two years, and have spent all that time on a few farms in this district. Many of you who have had more experience than I have had may be able to pick a few holes in this paper, but I shall not mind that a bit, and shall be very pleased if one of you will write a paper in reply. In the first place you do not appear to follow any kind of system in the working of your farms. I do not suppose many of you keep any kind of books, and when at the end of the harvest you find that you have some difficulty in making both ends meet, or possibly, have a balance on the wrong side, you wonder where the money has gone. You do not seem to understand that the working out of a proper system and the expenditure of a little time and money in the first place will save you many pounds in the course of time. I do not suggest, of course, that you can get things perfect all at once, but if you never make a start, and allow things to muddle along anyhow, you soon find yourselves in a mess. If you haven't sufficient means at first it is much better to borrow a little then instead of borrowing later at a much higher interest to pay off debts. A farmer should not have to purchase from outside sources anything which he can produce himself, especially in the way of feed for stock, and, perhaps, to a somewhat less extent, articles of food needed for personal consumption. It appears to me that your chief aim is to put as large an area as possible under wheat, and to sell all your crop with the exception of a few bags retained for seed and horse feed, and a small area cut for hay (the latter generally being that which you do not consider worth reaping), or perhaps, you may put in a little oats as well, and when you find that you have difficulty in obtaining water and feed for stock you say you have bad luck. You do not blame the real cause, namely, lack of system. Dealing first with the growing of wheat, the methods usually adopted in this are, I think, to put it mildly, somewhat out of date. Having cleared your land and ploughed it, or sometimes only using the cultivator, you drill in your seed with, and sometimes without, manure, and the succeeding crops are put in year after year on the last season's stubble without any previous preparation of the land. If a paddock should become very dirty it is sometimes ploughed after rain and then drilled in, or it may be subjected to a process which is called fallowing. This usually consists of ploughing in the winter and then drilling in the seed the following autumn. I cannot see why dry farming methods should not be suitable for this district. You do not appear to be too particular as to whether your seed is clean or not ; a few ' heads ' or oats, and, in some cases, drake, do not seem to matter. Neither do you seem to trouble much in the way of selection of seed. I do not mean in keeping the varieties separate ; but all cultivated plants, and wheat most particularly, will deteriorate unless ' new blood ' is introduced from time to time. I do not, of course, suggest that you should get new seed every year, but if you do not do so occasionally the result is practically the same as the result of in-breeding in stock. In picking wheat you do not appear to follow any fixed rule in regard to the strength of the solution used ; I know of one case in which it was judged merely by the color, and that by the light of a lantern. I should think it was as important as the giving of medicine ; if the solution was too weak it would have no effect, and if too strong it would kill many of the grains, or at any rate retard germination. With regard to manure, you do not appear to follow any rule either as to variety or quantity. The usual quantity used appears to be somewhere about 30lbs. to the acre, and when I noticed that one particular farmer used 60lbs. I asked a member why the others did not use the same quantity, and he replied that if the crop did not turn out very well the other 30lbs. would be saved. This is, I think, rather a peculiar argument. With regard to the question of water for stock I think that, although many of you still waste a considerable amount of time in carting water, the wisdom of making proper provision at first is admitted by all, so I will not say any more on this subject, but will now deal with the feeding of stock, the state of affairs with regard to which is most unsatisfactory. A farmer should grow all the feed he requires for his stock and should not have to buy anything from outside, except, perhaps, such things as ' prepared foddere, like molasses. In using the word ' stock ' I refer at present exclusively to horses. As most of you have, under present conditions, no feed at all by haymaking time, I will commence there. Most of you do not cut much wheat for hay, and this is, as a rule, all or nearly all gone by the time cocky chaff is available, and you have much difficulty in making this last through the seeding ; in fact, many of you have to curtail your seeding operations for this reason or else you have to cart it from long distances, or buy hay or hay chaff at high prices. Very few, at any rate, have any left for fallowing without obtaining it from outside. You may say that you get cocky chaff for nothing ; I wonder how many have reckoned up what it costs in pounds, shillings, and pence in carting a load with four to six horses from

a distance of anything up to 20 miles, taking, in some cases, two days, and perhaps half a day previously fixing up the frame, and then getting enough chaff to last a little more than a fortnight besides having to use wheat (in some cases part of that which you had kept for seed), or buy bran and pollard to go with it. You must also look at the time you waste in going to fetch hay or hay chaff and bran and pollard, besides having to pay high prices for them. You do not appear to realise the number of people who successively deal with wheat between the producer and consumer, the latter often being yourselves in respect of part, namely, bran and pollard. I have not tried to work this out thoroughly, but I should think it must be about a dozen and each one must make a profit. You may say that the more wheat you reap and clean the more cocky chaff you will get, but this is useless by itself. You may also say that you have to sell all the wheat you can in order to pay your debts, but the majority of these are incurred through not previously making proper provision for the feeding of stock, and other forms of mismanagement, which I will deal with more fully later on. Every farmer should cut enough crop for hay or hay chaff to last until the next harvest, or perhaps a little longer, in view of the possibility of there being a bad season at any time. If he did this, and also saved all the cocky chaff from the crop he reaped and some bags of wheat, he would have to buy very little else from outside. Personally, I think all wheat given to horses, especially old ones, should be boiled or crushed. If it is given raw there is the risk of giving too much, and a good deal passes right through. The different varieties of wheat become mixed in this way, as you cannot always feed your horses on the same variety as that you are putting in the paddock you are working them in. I think you should find out which is the most suitable hay-wheat for this district and grow sufficient for your needs. You may say that your greatest difficulty would be with the stumps, but most new blocks have a few acres of plain or bush, and a good many of you have old paddocks which I do not think would be so stumpy if they were ploughed a little more frequently. In the following remarks I will include cattle and sheep in the word 'stock,' and also horses where they may be applicable. I think you will agree with me that except in very good seasons the natural grasses, especially those growing on the uncultivated plains, cannot be relied on, and perhaps for this reason you do not keep as many cattle and sheep as you should, and those that are kept can scarcely be said to be in tiptop condition, and many of you have to send your stock to other farms, in some cases a considerable distance away, where the feed is perhaps a little better. You would not be able to do this in a bad season, as the other farms would very likely be in the same plight as your own. Some of you may object to cattle owing to their habit of getting through fences, but I think this is, at any rate in the first place, more the fault of the fences than the cattle. I will put a former statement I made in a somewhat different form and say that a district, particularly an agricultural one, should not have to purchase anything from outside sources which can be produced in it, especially such things as meat (beef, mutton, pork, and bacon), milk, butter, vegetables, fruit, and eggs. I cannot understand why such a large quantity of tinned meat should be consumed in this district, as you derive no benefit from its production. It is quite a novelty to get a little fresh meat now and again. Neither can I understand why you do not eat rabbits. There are plenty about here, but you do not appear to trouble much about them as long as you can keep them out of your wheat paddocks. As netting costs somewhere about £20 a mile I do not see why you should not endeavor to get some of it back from them. I suppose most of you do not know that they are regarded almost as a luxury at home, and that large numbers are exported from this country. Why should you not have a share in this trade? With regard to butter and bacon, there appears to be a large quantity used in this district which is not produced here, and from which, therefore, you derive no benefit, and milk is often very scarce. I think every farmer should keep a few cattle, sheep, and pigs. Sheep are most useful for feeding off dirty land besides bringing in a nice little cheque at shearing time, and pigs can be given many things which would otherwise be wasted. With regard to cattle and sheep the question of feed appears to be the chief difficulty. I do not know why something has not been done in the way of growing roots and forage plants and grasses. A few of you occasionally get one or two packets of turnip seeds and peas and run them through your drills with the manure when sowing wheat, and quite recently I have seen turnips a foot or more in circumference and peas 2ft. or 3ft. high. Your only object in doing this appears to be to provide vegetables for yourselves, and you invite your neighbors to come and gather as much as they like and waste the rest. Has it ever occurred to you that turnips and other roots are a most valuable feed for cattle and sheep, and, if gathered and stored under proper conditions can be kept for some time; also that peas can be used for feed or cut for ensilage besides providing valuable manure if ploughed in green. I have also seen a great deal of mustard, which is good feed, growing about here, but I do not think

it is advisable to grow it with wheat. Some of you appear to be trying what you call experiments in growing lucerne, clover, and grasses, but putting a few seeds in a jam tin or in a small piece of ground can scarcely be called an experiment. Has it occurred to any of you to grow any of the native bushes such as bluebush and saltbush where they do not happen to grow at present? I wonder why some effort has not been made to reclaim the thousands of acres of samphire swamp in this district for the purpose of growing feed for stock. I suppose some enterprising Chinaman will be the first to find out that vegetables and fruit can be profitably grown on the sandhills in this district. I understand that water can be easily got there, which would be good enough for irrigation. While speaking of irrigation, I might say that I think the Government should be approached with a view to the sinking of a bore to see if a supply of fresh water can be obtained. I understand that an attempt was made some time ago, but was abandoned owing to the breaking of the drill. An individual farmer can hardly be expected to make the first attempt, and very little of the water found by sinking wells is any good for irrigation: indeed, it is in many cases too salt for stock, and it sometimes happens that no water at all is got owing to granite being encountered. I believe irrigation would be the making of this district. The outbuildings on some of the farms in this district appear to be in a deplorable condition, particularly stable yards and sheds for storage of feed. The stable yards do not appear to be ever cleaned out, and much feed is wasted owing to its being exposed to the weather and the attacks of vermin. I do not suggest that expensive material should be used, but I think that the material available at present, although rather unpromising, might be put to better use. I think all sheds should have iron roofs, so that as much water could be caught as possible. I am aware that sheds with iron roofs are hotter in summer than those with straw; but if iron roofs were painted white the interiors of the sheds would be much cooler, besides preserving the iron. Implements containing a large proportion of wood, such as wagons, drills, and winnowers, are dried up and knocked to pieces in four or five years. They would last much longer if properly painted from time to time. You do not appear to realise the value of co-operation. The success of one farmer depends to a large extent on the success of his neighbor, and as there are practically no trade secrets in farming, it does not hurt one, but on the other hand rather flatters him if another copies his ideas, so I do not see why you should not work together more than you do. Using the word "co-operation" in a commercial sense may bring to mind the name of a union already in existence, which I think should receive more support than it appears to receive at present. You are no doubt handicapped a good deal by the scarcity of labor, but I think you can do a good deal towards remedying this trouble. In England, as well as in this country, owing to the advance of education, the young people flock to the towns from the remote country districts, and do not care to leave them because they have more opportunities for intellectual and social intercourse; and where country districts have provided these opportunities, I do not think the trouble is quite so acute. I think you ought to have a library and reading-room attached to your public hall, and form a literary and debating society, or something of that kind. Personally I have nothing to say against the "trade," but young fellows are only human, and like to meet together at times, and it is not to their advantage to have no other meeting-place in a township than the public-house. The success of a district depends entirely on its own inhabitants. You do not take full advantage of things you think you do not have to pay for, because you do not pay for them directly, but are included in your taxes. You know that the Government control an institution known as the Agricultural Bureau, and that there is a Branch in this district. About half a dozen of you attend meetings and discuss such things as the best way to fix wire netting, and how far apart and how deep fence-posts should be, and how deep you should plough. You say you have not done these things the way you suggest, but still you think they ought to be done that way. You may also discuss new methods of cultivation, &c., but you do not think they will work in this district. You who are members get your *Journal* every month free of charge. You may read in this *Journal* reports received from some learned gentleman who has gone to investigate agriculture in other lands; you may read something about Roseworthy College and the various experimental farms, and articles describing different methods of cultivation. &c., You may also read the poultry notes and reports of Bureau meetings, and you may also see that the Department of Agriculture issue and are prepared to send for a penny stamp bulletins and leaflets on various subjects relating to agriculture. You do not, however, appear to realise that you pay your share for all these things. I cannot see why you do not take more interest in the work of the Agricultural Bureau and of the numerous experts employed by the Department of Agriculture who investigate all branches of agriculture. I think you would take more interest if you had a library at your meeting

place, so that you could have information on the spot from which to take subjects for discussion. In conclusion, I should like you to understand that I wish all the foregoing remarks to be taken in a general way and not applied to any particular individual, because I look upon you all as personal friends, and can truthfully say that the time I have been in Penong has been the happiest of my life." [Discussion has been withheld for a future meeting.—ED.]

Petina, August 19.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. W. Penna (chair), Kenny, Keeley, Whart, Howard, Brascomb, Souter (Hon. Sec.), and two visitors.

The meeting was held at the homestead of Mr. E. Keeley.

WHEATS FOR DISTRICT.—Mr. Kenny introduced a discussion on this subject. Sullivan's Early he had found a bad wheat to shell out. It did not stool well, but was a very quick grower. Smart's Early was a good all-round wheat; it grew very tall, and for this reason was very suitable for new scrub land. Federation had done well, but owing to the short straw it was not suitable for new scrub country. Yandilla King was a good hay wheat, a good yielder, but was tough to reap. Silver King also was very suitable for hay. It yielded well, but ripened slowly, and the grain sometimes became pinched on this account. He sowed a bag of Ward's Prolific, from which he reaped 15 bags. This variety had a very fine straw and a flinty grain, although somewhat tough to reap.

Petina, September 2.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Penna (chair), E. and W. Keeley, D. T. and J. Kenny, G. A. and G. Newbon, F. Barns, and 14 visitors.

DEATH IN THE HAY.—Mr. Drever had had horses die through eating hay that had been carted and stacked too soon. The stack heated, and had to be pulled down, and the hay was restacked after a time. Horses had been feeding on it for six months, and then suddenly were affected. A number of horses died. One mare had been in slings for 16 weeks, and apparently was recovering.

Petina, September 16.

PRESENT.—Messrs. W. Penna (chair), Keeley, G. A. and G. Newbon, Brascomb, Simmonds, Thomas, Doley, and seven visitors.

SORE SHOULDERS.—In reply to a question as to the reason for the appearance of lumps on horses' shoulders, after collars had first been restuffed and lined, members said overfeeding with wheat would most likely be the cause of the trouble.

SYSTEMATIC FARMING.—Mr. A. J. Thomas read the following paper:—"If we allot to each month of the year certain duties, we can then readily ascertain if we are getting in arrears with our work, and, if so, cut out some of the least pressing of these duties so as not to get behind with the more important ones, such as fallowing, shearing, seeding, haymaking, and reaping. If we get behind at the start in these matters, the work of the farm seems to get out of order, and, speaking from personal experience, we have a lot of unnecessary worry. I have given the matter careful thought and, in my opinion, the following system is very suitable to this district:—A man with a six-horse team should be able to comfortably work 300 acres. We will suppose, for example, that we have a farm employing two six-horse teams. In January we should complete harvesting and carting wheat, but possibly the carting may extend into February. In February we should finish wheat-carting, then we could rake and cart straw, cover sheds, and catch up odd jobs that have fallen into arrears during harvest. In March it is necessary to get seed wheat cleaned and ready for sowing, super. carted, drills in working order, harness oiled and mended, and begin drilling during the last week of March. By April seeding should be in full swing, with each drill doing 10 acres daily or 50 acres weekly—300 acres should be completed in six weeks. During May we should finish seeding. Drills should be well overhauled before being put away in the shed, and should be put away in good order; the man who has been working it should know exactly what is required, and they can,

therefore, be more readily put in order now than when they are being taken out of shed to begin the seeding, or at any other time. Super. bags should be thoroughly washed and dried and hung over a rail in a shed or other dry place. Wallaroo, or Chemical Works bags, if thus treated, answer well for holding oats or screenings. [Even if fodders are put in super. bags they should never be placed in bags used for bone or blood manures, as with these there is always a possibility of anthrax being introduced from abroad.—Ep.] During June we could cut shoots, fence and clear land ready for fallowing; 600 acres should be made rabbit proof, so that when fallowing is done rabbits within will perish or be readily exterminated. Fallow during July and August. If 150 acres is done by each plough, and this 150 acres is cropped a second time, the fallowing will be a small matter and should be completed in four weeks; but if the full 300 acres for each team is required it will take the full two months to finish fallowing. In September fencing, tank or well sinking, shed building and shearing need attention; and October can be set aside for odd jobs. Get the chaff sheds and frames ready, also hay frames. Overhaul machinery and harness, and get all in readiness for harvest. During November do the haymaking and begin harvesting. By December harvesting is in full swing. It will be seen, when this plan is followed, that the horses are at work in January and February, they then have five or six weeks' spell, are engaged on seeding for eight weeks, spell in June, on fallow July and August, spell September and October, and should be in good condition to commence harvesting. A holiday might be fitted in for September show, or in March—after harvest and before seeding."

Utera Plains, September 2.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Ramsey (chair), A. and C. L. Venning, J. and M. Abrook, H. T. and H. G. Hornhardt, Guidara, Braunaack, Howell, Stephens, A. and G. Barber, Gale, Bilney, Hill, Naughton (Hon. Sec.), and six visitors.

HORSES' COLLARS.—The paper printed on page 1209 of the July number of the *Journal*, by Mr. Taylor, of Wilkawatt Branch, was read and discussed. Members thought a false collar made of bran bag was of great benefit where sore shoulders had been contracted. They did not believe in cutting the collar, preferring to have it remodelled to suit the horse by the saddler. One member favored the spring steel collar, but others had had no experience with it.

HAY STACKS.—The paper read by Mr. Bayne, of the Pine Forest Branch, and printed in the May number of the *Journal*, was read. Members thought thatching was not necessary, except in very wet districts. In this district hay was seldom kept for more than 12 months and in that time very little damage was done.

Yadnarie, September 3.

PRESENT.—Messrs. Schubert (chair), Kruger, G. A., L. C. J., and F. Dreckow, Jericho, Priggs, Brown, Parbes, Dear (Hon. Sec.), and five visitors.

BRINGING SCRUB LANDS UNDER CULTIVATION.—Mr. F. Dreckow read a short paper in which he said it was advisable when clearing scrub lands to thoroughly clean a small portion at a time, according to the labor available. Newly cleared land should be sown thickly, and early. One advantage of the thick sowing was that it provided a good stubble for burning. In the discussion which followed the reading of the paper the Chairman considered a thick growth of wheat on new land prevented the sun from baking it and absorbing the moisture. Mr. Spriggs favored thick sowing, and considered it a mistake to clear more land than could be worked thoroughly. When cleared if the shoots were again allowed to grow, a good deal of trouble would be experienced. Mr. Brown considered 50lbs. of seed per acre sufficient for new land. The Hon. Secretary thought 45lbs. to 50lbs. enough, unless the land was of a light sandy nature.

ROLLER v. SCRUB LOG.—Members agreed that the scrub log was preferable to the roller for clearing purposes, excepting where it was necessary to use horses instead of bullocks.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Geranium, August 19.

PRESENT.—Messrs. Mitchell (chair), Leahy, Charlton, W. and F. Hammond, Goldsworthy, Lang, Mitchell, McLeod, W., E., and H. Blatchford, J. Mitchell, Jacob, and Pannell (Hon. Sec.).

FODDER CROPS FOR PIGS.—In reply to a question as to the most suitable fodder to grow for pig feed, it was pointed out that where a crop was to be grown for this purpose, the question of maintaining soil fertility was an important consideration. Peas fattened pigs quickly, and produced a fine, firm pork. In addition this plant added plant food in the form of nitrogen in the soil. The pea straw was a good standby if stacked and protected against rain. Next to peas pollard was recommended for pigs. Mr. Lang had proved from exhaustive experiments that pollard fed dry was more effective than when given in slop form. Dry pollard had to be thoroughly masticated, but when fed as a slop the animals gorged it, with the result that it passed through them undigested.

DESTRUCTION OF RABBITS.—After a discussion on this subject, it was agreed that the best means of destroying the pest was to fumigate the burrows with bisulphide of carbon, and then explode them with the aid of a short piece of fuse. It was also found that digging the warrens in and placing sticks, twigs, old bags, &c., in the holes to increase the difficulty of scratching was helpful.

PREPARING SEED BED ON STUBBLE.—It was considered better to work stubble when damp than when it was dry, but when rain was not expected the land would be kept in much better heart if it was lightly worked as soon as possible after harvest. When the rush of work was over it could be worked again, and by seeding time a very good seed bed would result.

Monarto, September 7.

PRESENT.—Messrs. Braendler (chair), C. Hill, sen., G. and H. Patterson, G., R., J., and E. Hartmann, Hein, Thiele, Kuchel, J., T., and E. Frahn, Harper, Daly, Richards, Altmann, Anders, Jas. Daly, A. and B. Schenscher, Thomas, jun., and Siebelt.

FALLOWING AND WORKING LAND.—Mr. C. F. Altmann read the following paper:—
 “I prefer fallowing early, about the beginning of June, as early fallow settles down better and the weeds have a good chance to grow before cultivating in spring; 3½ in. to 4 in. is deep enough to work the land, but it is necessary to turn the ground well to bury all weeds, as they grow and seed if left in half-turned fallow. Fallowing deeper than 4 in. I find gives no better results. In many places the clay subsoil will be brought to the top, and the land thereby spoilt altogether. I have tried various depths, and find this ample. Some years ago a farmer in this district fallowed to a depth of about 2 in. with good results. When one is fallowing deep an extra horse or two will be required. I have ploughed in strips, fallowing one side of the land with lands 3 chains wide, 5 in. deep, and the other 4 in. I have even tried 3 in., and found no difference in the growing crop, or when harvesting, it being quite even. As some land will plough better when wet, and other land when drier, I pick out the stiff and heavy land and fallow it when wet, leaving the other for when a dry spell comes. This practice will not only enable me to do more fallowing, but make better work of it. When starting at one side, or ploughing around the paddock, one will turn some of the light land at the same time as the heavier soils. When a dry spell comes big clods are broken in one place, and a few chains further it ploughs quite well. If ploughed in lands and stiff strips picked out, when wet, it will be found that very often a whole paddock can be fallowed, whereas by ploughing around the paddock a big plot is left in the centre because it is too dry. I harrow as soon as possible after ploughing, before the ground sets, or immediately after a rain. It is a good plan to attach a light harrow to the plough and harrow the land as it is turned. Thereby a good deal of time and labor can be saved. Of course this can only be done when the land is free of high stumps and other rubbish. Straw and rubbish can be overcome by clearing or burning off before ploughing. It is no advantage to fallow under too much straw and rubbish, because in the absence of rain it will not rot, and will cause trouble later on. If the ground is not set hard, I find a spring-tooth cultivator can now be used with advantage. If the ground is firm, also if the fallow is dirty and weedy, I use the skim plough, because it kills every weed and buries them at the same time. The spring-tooth cultivator

is only suitable when fallow is clean or weeds are very small. Fallow should be cultivated in spring, even if it is clean. By this means it will be worked to a better tilth. I would not harrow sandy land at once, but would leave it with a rough surface as long as possible. If harrowed immediately after being broken up it will have a smooth surface, and will drift almost at once. I cultivate light land with the spring-tooth cultivator. The skim plough leaves it too level, and the land is more subject to drifting. Leave light land as ridgy as possible. In these parts it is advisable to cultivate from north to south. We always have storms blowing from west to east. By cultivating east to west the wind will blow along the furrows, and the ridges will be no protection, however deep. Four items are to be remembered—(1) Clean the land before starting, and if possible burn straw and rubbish. (2) Plough about 4in. deep, turning the ground well. (3) Harrow at once, or immediately after a rain. (4) Cultivate well in spring." A lengthy discussion followed the reading of the paper, members generally agreeing that it was not possible to work land too much. It was thought that from 3in. to 4in. was deep enough for ploughing in this district, but Mr. Anders considered deeper ploughing better.

LAMBS FOR EXPORT.—Mr. Richard Hartmann read a paper, as follows:—"For a number of years lamb-breeding for export has been a good paying business. A profit can be made out of as few as 20 or 30 ewes. They can be purchased for 7s. or 8s. per head. After shearing, and if properly managed, should bring in a return of from 15s. to 20s. per head within the first 12 months. The ewes, if then too old for breeding, could be fattened for killing, and would be worth their initial cost. In selecting ewes I prefer the pure Merino. They should be free from wrinkles on the body or neck, and must not have too much wool in the face. Do not purchase anything under a six-tooth, as young ewes do not care for their lambs properly, and have not the quantity of milk that old ewes have. In selecting a ram you will find one of the British breeds the best. I like the small-headed breeds, like the Dorset Horn or Southdown, as they will not be the trouble in lambing as when the ewes are put with a Shropshire or Lincoln ram. The lambs will have a nice shape and look well in the saleyard. In our district lambs should not be bred too early. The middle of April is early enough, as the early lambs mostly get stunted: they grow long wool but very little size, and buyers do not favor them, while the late lambs will keep on growing and look much better by the time they are ready for sale. Lambs should be kept separate from sheep, as the latter travel about and pick all the best feed before the lambs get at it. Shift them about from one paddock to another, as it will make them fill out much quicker. Sheep should be kept on every farm. They eat what the other stock will not touch, and thus they improve the land." In the discussion which followed Mr. A. Patterson said he had crossed the Lincoln with the Shropshire with satisfactory results. It paid to buy the best of ewes. Mr. F. C. Thiele preferred the Northern sheep, as they were big framed and hardy.

Parrakie, September 23.

PRESENT.—Messrs. F. J. Dayman (chair), Beelitz, A., O., and C. Heinzl, Threadgold, A. F. Dayman, Neindorf, Lee, Gravestocks, Morrison, Harnseister, Randell, and Diener (Hon. Sec.).

CLEARING LAND.—Mr. F. W. Randell read a short paper in which he expressed the view that the best means of clearing land in the Pinnaroo district was by means of a good scrub roller, about 8ft. or 9ft. long, and 20in. to 24in. in diameter at the larger end. Rolling should commence in August if the scrub was well grown, and in November where it was small. Burning should be commenced the first suitable day in February. The land should be ploughed the first year, and fallowed the following. In discussing the subject, Mr. A. J. Beelitz said October or November was too soon for rolling. He would not burn until March, as it then checked the growth of young shoots better when the burning was late. Mr. C. Heinzl thought light scrub should be rolled late. He would crop the land several years in succession, in order to kill the roots. He had tried leaving it out the second year, but the result was not satisfactory. Mr. Threadgold would roll and burn before the wet weather set in, and would crop several years in succession. Mr. F. Gravestocks would roll early to encourage the growth of the shoots, which would be killed by the fire. He would crop for three years in succession. Mr. Lee would roll with a heavy roller and burn off late, so as to save as many ashes as possible. He would cultivate without ploughing the first year, and next year would fire, rake, and plough. He would pull out 50 per cent. of the stumps, and the next year would have the land nearly clean. Mr. J. Ferne would log the scrub, and burn in February, before the weather got damp. He would plough the land the first year, and fallow it the second. The Chairman had rolled some land, and

had had the shoots cut, but could not get them to burn. He thought he would have done better had he burned patches and fallowed it up, as the crop on it was not too good. With green scrub he would crop twice, and then fallow. Stubble fire improved the land. He burnt some the first year, and could tell the difference several years afterwards. He had also fallowed up some land with four-year-old shoots on it. He worked it well, and it returned a very good crop. Mr. Lewis would roll the scrub, disc the shoots, rake up, and then burn. The Hon. Secretary had rolled late and burned late with satisfactory results.

Renmark, September 13.

(Average annual rainfall, 11 in.)

PRESENT.—Messrs. Muspratt (chair), Geneste, Nuthall, Basey, Davies, DeWitte, Huggins, Milner, Waters, Everard, and Cole (Hon. Sec.).

PEACH APHIS.—Messrs. Basey and Cole reported that their peach trees had been attacked by aphids. Mr. Davies had sprayed trees with kerosine emulsion and tobacco wash, but was unable to combat the pest. Mr. Muspratt thought resin wash would be an efficient remedy.

BROWN SCALE ON ORANGES.—The following spray was recommended for this disease :—Kerosine, 2 galls. ; water, 1 gall. ; soft soap, 1½ lbs. Mix soap and water, add kerosine while hot, break down 10 to 1 spray at 160° Fahr. if possible.

SHAPING PEAR TREES.—Considerable difficulty had been experienced by growers in keeping pear trees from growing to the centre. Mr. Basey had tried pinching back in summer to encourage an outward growth, but had little success. He had also tried placing sticks between the limbs, but found that they came out with the first wind. Mr. Nuthall suggested that hoops from casks should be placed in the centre of trees, the branches being tied to them. This idea met with general approval.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, September 5.

(Average annual rainfall, 35·3 in.)

PRESENT.—Messrs. S. Chapman (chair), T. and A. Jacobs, Ricks, A. and E. Broadbent, C. and J. Lewis, Stone, Curnow (Hon. Sec.), and two visitors.

ROOT-PRUNING OF FRUIT TREES.—Mr. Chapman read the following paper :—"Root-pruning is a practice sometimes resorted to as a means of restoring fertility in trees and plants which have become rank and sterile in growth. The effect is to reduce the supply of crude sap to the branches, and consequently to cause a check in their development. All roots that have struck downwards into a cold uncongenial subsoil must be pruned off if they cannot be turned into a lateral direction, and all the lateral ones that have become coarse and fibreless must be shortened back by means of a clean cut with a sharp knife. The operation is best performed in late autumn, and may be safely resorted to in cases of fruit trees of moderate age and even of old trees if due care be exercised. In transplanting trees all the roots which have become bruised or broken in the process of lifting should be cut clean away behind the broken parts, as new roots will then more readily strike out from the cut parts. In all these cases the cut should be a clean sloping one, and made in an upward and outward direction." With regard to the effectiveness of root-pruning in the case of barren trees, the writer referred to the *Journal of Agriculture* of July, 1908, page 1085. In discussing the question, members agreed that the system was only suitable for small gardens, where land was held in limited quantities. From the commercial standpoint it would not pay to treat trees in the manner suggested.

Clarendon, September 7.

(Average annual rainfall, 33½ in.)

PRESENT.—Messrs. Harper (chair), Brooks, Shiedow, Morphett, J. and L. C. Spencer, H. C., and H. H. Harper, Tester, and S. White.

KING'S EARLY WHEAT.—Mr. White tabled two samples of this variety of wheat, which were showing splendid growth to a height of 2ft. 6in. The seed was planted in sandy soil on March 28th and April 15th, respectively.

POTATO-GROWING.—Mr. G. Shiedow read the following paper:—"After selecting the piece of land we intend planting with potatoes, the first thing to be done is to study the nature and quality of the soil. Then purchase seed suitable for your plot. If the land is of a heavy, stiff nature, I prefer the Victorian Pinkeye, the Bismark, the Redskin, or even the Brown River species. If you have light, loamy or sandy land, the white skinned potatoes—Up-to-Date, Beauty of Hebron, Carmen, or the Prolific will be most suitable. The Snowflake is a very poor potato to plant for the spring crop, but very good for summer planting, especially under irrigation. Never try to work the land when it is wet. The drier it is when worked the better. I favor ploughing in the middle of summer, fairly deep, say 7in. or 8in., and leaving it in its rough state open to the sun and wind. By doing this all the weeds are killed and your land receives strength from the elements. Cart your stable manure out in February and plow it in. It keeps the ground porous and at the same time the manure is decaying. If you have no stable manure and are using bonedust, do not sprinkle the bonedust in the furrow or trench directly underneath the potatoes. When this is done the roots of the potatoes make for the bonedust and feed upon it, and you will find all the tubers are in a little clump around the manure. Broadcast the manure all over the land when you are ready to plant your potatoes, and plough it in in the ordinary way. If this is done the roots of the potatoes will spread out, and when the warm weather comes your potatoes will stand it a lot better. When cutting the seed do not start to the sets off at the heel or stem end of the tuber, but cut as many times through the nose of it as you can. This will result in a more even crop, and you will have a better result. Plant about 5in. deep and cover with very fine earth. Just when the plants are peeping through the ground give them a good harrowing. If your ground will allow it scuffle, chop, and earth up as it becomes necessary."

Forest Range, September 7.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. J. Green (chair), Sass, Pollard, E. and F. Rowley, Schutz, Tribe, Collins, E. Green, Smith, McLaren, and Monks (Hon. Sec.).

"THE JOURNAL OF AGRICULTURE."—The Hon. Secretary read a criticism of the *Journal of Agriculture*. He thought the *Journal* catered for the needs of all sections of agriculturists, but not horticulturists. The result was that many fruit and vegetable growers were becoming tired of the *Journal* and the Bureau. In proportion to their numbers and strength he considered the horticulturists had taken a fair share of the work of the Bureau. He objected to the printing of advertisements in the *Journal*, and considered it should be mailed quite free of charge to producers. A resolution was then carried—"That ample space should be provided in the *Journal of Agriculture* for notes upon horticulture, and that Mr. George Quinn write such notes." Messrs. McLaren and Vickers agreed that it would be better for fruitgrowers if more space were devoted to these industries. [The writer evidently does not place such importance upon the opinions of practical horticulturists as others do. Whatever the topic of discussion from time to time, the value of this interchange of opinions must be considerable.—ED.]

Gumeracha, September 4.

(Average annual rainfall, 33ir.)

PRESENT.—Messrs. B. Cornish (chair), H. V. and A. W. Cornish, Monfries, Norsworthy, Moore, Hittmann, Randell, Lee (Hon. Sec.), and one visitor.

FODDER GRASSES.—Mr. Monfries read a paper on this subject. Having spoken of the necessity for increasing the productiveness of the land, the writer referred to the fact that the soil in this locality had become "cow sick," just as in earlier years it had failed through the continuous cropping, to yield profitable returns of wheat. The paper

continued—"Then it was found that those farmers who grew a crop of peas and the next season followed with a hay crop received a much better return, but they did not know the reason. Since then it has been found that the soil was deficient in nitrogen, and that the pea crop gathered this from the atmosphere and supplied the want. All our natural grasses appear to have been eaten out. There are only three months during the year that our grass land is of any use, viz., October, November, and December, after this the stock go off in condition and require feeding. To remedy this, I would suggest dividing our large paddock into smaller ones, say from 15 to 20 acres, and planting suitable grasses. The only difficulty I see in the way is supplying them with water. There are several kinds of grasses suitable for this district. No. 1 paddock I would sow with a mixture of Cocksfoot and Perennial Rye grass. Cocksfoot is one of the most valuable grasses for permanent pastures, it is of a vigorous constitution, grows in almost any soil, and grows again very quickly after being eaten or cut. It also grows well under trees. The Perennial Rye is of very early growth. It bears grazing well and succeeds in average soil. No. 2 paddock I would sow or plant with roots of *Phalaris commutata*. This I consider to be one of the best grasses for producing a large quantity of feed. It grows during summer and winter, stands the frost as well as the heat, and grows most luxuriantly. It can be cut for hay, as it grows as tall as 6ft. I have some growing and have cut it several times, and it grows again very quickly. Horses and cattle are very fond of it. I consider it superior to *Paspalum dilatatum*, as the frost does not injure it. *Paspalum* grows well during the summer months, but it goes quite brown during the winter. Another paddock I would sow with lucerne, which is the king of fodders. I would use this for providing feed for the winter months in the shape of hay, chaff, or silage, as lucerne will not stand being fed off, it soon gets eaten out, but if cut will stand for 12 or even 15 years. I have a small plot that has produced splendid cuts for fully this length of time, but have always cut and top dressed it. It requires to be sown in September, as soon as the frosts are over. For producing lucerne, and grasses included, you require to have your land in good order. It will not be sufficient to just plough, harrow, and roll, it must be worked until it is almost as fine as sand, and then you will get a return for your labor. For lucerne I would sow at least 12lbs. of seed to the acre through the drill, with 1cwt. of super. or bonedust. Sow 40lbs. or 50lbs. of Perennial Rye seed to the acre. Of *Phalaris*, I would grow a patch from seed and then transplant the roots in rows 18in. each way. I would plough the same as is done for potatoes, and place the roots in the side of the furrow, allowing the green portion to remain near the surface, and plough the next furrow on them, and then put the land roller over to press the soil on them. I have done this with *Paspalum* and every root grew. I feel sure the time has arrived when we shall have to pay attention to our grazing paddocks, in the way of manuring. We cannot expect to keep feeding them off without putting something back to help the land in producing feed. It would be well to harrow the paddock over where it could be done, and broadcast 2cwt. of super. or bonedust to the acre. This would be well worth a trial." In discussing the subject, Mr. H. V. Cornish said he had land which failed to grow wheat, but after an application of bonedust a splendid crop of grass came up. Clover grew luxuriantly after this treatment. Mr. Hittmann thought small paddocks, ploughed up every few years, and heavily manured, produced more and sweeter grass. Mr. Norworthy thought land subdivided into small paddocks and systematically grazed would carry more stock than it would without this subdivision. He would close some paddocks during the summer. When early rains came, the old grass would protect the young feed. Continually keeping one class of stock was injurious to the land. *Trifolium subterraneum* was a grass admirably suited to this district. Mr. Moore said it was necessary to consider the extra expense incurred in fencing small paddocks. There was also difficulty in providing water. No doubt stock appreciated a change of pasture, even if it were of no better quality. Rabbits were responsible for the destruction of some of the best natural grasses. He had been experimenting with artificial grasses and had found Cocksfoot very valuable. He did not consider Fog grass worth much. The *Trifolium subterraneum* was good feed and cattle would relish it when dry. Mr. W. B. Randell favored small paddocks and would enclose them with wire netting. The reason that cattle did not thrive as in former years was that the best grasses had been eaten out. He would run over grass land with chain harrows. Land was improved by keeping sheep. Mr. B. Cornish was confident that it would pay to manure grass. He had done this by running over land with a drill, thus the manure was evenly distributed, and for several years a marked difference could be seen in the color and quality of grass, and other kinds of grass that had not previously existed, appeared on the manured portion. It was well to plough the poor land, which would grow several crops if well manured, and when laid down would produce a greater quantity and better quality grass.

Hartley, September 7.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Wundersitz (chair), Brook, Tydeman, Hudd, Symonds, Phillips, Pratt, Stanton, Birmingham (Hon. Sec.), and three visitors.

WORKING MARES IN FOAL.—Considerable discussion took place on this subject. The majority of members thought it would not hurt to work a mare in chains right up to the time of foaling. It would keep her from getting too fat, and would at the same time enable her to earn a little towards her keep.

EFFECTIVENESS OF BARBED WIRE FENCES.—The Hon. Secretary read a paper on this subject, in which he pointed out that the barbed wire was a most effective barrier, and was not dangerous unless allowed to become loose. The safest way to fence with it was to bore a 1½ in. hole through the posts, thread the barbed wire through with a plain wire, and, with the aid of a steady horse, strain properly. Staples were liable to drop out and allow the wire to sag.

Kingscote, September 4.

(Average annual rainfall, 18½ in.)

PRESENT.—Messrs. A. Neave, D. C. Murray, K. Nash, P. Bromfield, G. L. Hawkes, G. Barrett, R. W. Nash, A. Turner, C. Ewens, C. Castine, A. Anderson, P. T. Bell, J. Dewar, F. Wood, J. Codling, J. Wright, R. J. Cook, and W. H. Strawbridge.

EXPERIMENTAL FARM FOR KANGAROO ISLAND.—Mr. Castine read the following paper on this subject:—"My object in choosing this subject for a paper is to open a discussion on the possibilities of the ironstone country on Kangaroo Island, and the great advantages that must accrue from the successful settlement of our many thousands of acres of unutilised land. This much-to-be-desired end is, in my opinion, possible, but can only be attained by the establishment of a Government experimental farm. And in arguing why the establishment of the farm should be undertaken by the Government I would point out that while the present Kangaroo Island residents would benefit by the successful settlement of the island, the benefits accruing to the Government would be many times greater, not alone from a revenue point of view (the majority of the land being Crown lands), but also from that of the gain by increased population. It would be out of place to illustrate in this paper what a danger to the whole of Australia Kangaroo Island would be in time of warfare, with its wonderfully safe and roomy harbors and its present scant population. In advocating the establishment of the experimental farm I propose to touch on those products which I have proved suitable for the ironstone country, and which I believe with the assistance of the farm to teach their proper use, would form a solid foundation for successful settlement. It should be understood that in referring to Kangaroo Island land in this paper, the eastern portion of the north coast country is not taken into consideration. That portion of the island has already proved itself. I propose to deal only with the back country, commonly known as the ironstone country, including as it does the wonderfully rich alluvial flats of the Cygnet and other rivers and the many deep alluvial flats lying between the ironstone ridges. But, in passing, I would like to allude to the present experimental plots. The policy of continuing to grow wheat and barley after the past year's experiences is, in my opinion, wrong. In the past many experienced farmers have given endless time and expense in trying the same experiments, only to learn, with disappointment, that wheat and barley alone will not successfully settle the ironstone country. Therefore, taking this for granted, it is as well for us to turn our attention to those crops which we have proved do well with us. From my own experience I must give rye the most prominent place. I have seen rye, sown in June, grow to a height of 3ft. by the beginning of September, when it was fed off bare with bullocks; and although the ground was very soft and the plants much trodden into the soil, the crop again grew to the height of 3ft., and when reaped with the ordinary stripper, yielded 5bush. per acre. I consider that this was a splendid return, seeing the treatment the crop received, as while the feeding off was necessary and benefited the plant, the bullocks pugged in a lot of the crop. The soil was a true sample of the ironstone country. Therefore I am of the opinion that had we a market for rye that cereal could be profitably grown all over the island. And the question arises could we not make a market by growing sufficient to export to Europe. Professor Perkins, in the *Journal*, states that about 2,000,000 acres of rye are sown in Spain yearly, averaging about 11bush. per acre. Unfortunately no market price is given, yet one is justified in thinking that this must be a good paying crop, seeing that the 9,000,000 acres under wheat averaged

as high as 12½ bush. at over 6s. per bushel. I am of the opinion that our land would equal the yield of 11 bush., and in addition supply a good body of green feed for sheep at a time when feed is very scarce. Next to rye I am in a position to place turnips. After a crop of oats had been drilled in turnip seed was broadcasted and then harrowed. The turnips produced were practically as large and as sweet as it is possible for them to grow; they were certainly far larger than those to be seen in markets. But this will be readily understood by those who have experienced how suitable our soil and climate is for turnip-growing. The soil again in this instance was ironstone country. After rye (a cereal) and turnips (a root crop) comes a clover (*Trifolium subterraneum*). This clover is, in my opinion, going to take first place and make the island. It has a rather creeping habit, and after making a fine body of succulent fodder, flowers and places its seed on the ground at various distances from the plant root; consequently the following year's plants are spread over a much greater area. This clover once started needs practically no attention as, being a nitrogenous collector, it is continually enriching the ground, partly by root, and partly by the decaying leaves of the plant. From one seed planted at "The Springs" three years ago on pure ironstone country there are now springing up plants too numerous to count, covering an area of many square feet. And this land has been heavily stocked at all times. One other plant, *Phalaris commutata*, promises to supply our biggest necessity—good early winter feed—and has now decreased to a price well within our means. I am not in a position to speak of its success on the pure ironstone country, but have no doubt of its liking for our alluvial flats. Having proved that rye, turnips, and clover are certain successes on the ironstone country, the question arises how best to utilise them so that, combined with yacca gum, eucalyptus oil, potato and onion growing (which is possible on the alluvial flats), together with such other products experiments may produce, successful settlement will be possible. Having no local market for rye as a cereal, would it be possible to carry on dairy farming successfully were the rye cut and made into ensilage? Would this, with the turnips and clover, be sufficient, or would it be possible to rear and fatten sheep with these products? Those questions can, in my opinion, only be correctly answered in one way, and that is by the establishment of a Government experimental farm, where the experiments can be properly made, and where, for the good of the State, they should be made. Apart from the plants already mentioned, there also must be many others which experience would find suitable to the islands but to experiment in which is beyond the means of private individuals, but well within the limits of a Government which has a large tract of Crown lands within easy distance of the capital city desiring population. A few plants which suggest a possibility are—New Zealand oats (equal to the finest in the world), to be made up locally into oatmeal. Hops, which are extensively grown in Tasmania, where climatic conditions are much like our own. Tobacco, which has been most successfully grown at Mount Gambier. Flax, for linseed. In New Zealand two acres of flax, grown alongside and with the same treatment as a crop of oats, 30 lbs. of seed per acre, yielded 46 bush. per acre, which realised 5s. 9d. per bushel. Flax is a hardy plant, and requires little attention. Chicory, for coffee, yielded in Victoria up to 10 tons per acre, and realised from £3 to £5 per ton. Broom corn, for broom-making. This is being very profitably grown in New South Wales. Sugar beet, for sugar. Wattles, for wattle bark. Sunflowers, for oil. Peanuts, for stock and market. Mangolds and other root crops, for stock. These crops I have been successful with."

Longwood, September 9.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes (chair), Oinn, Roebuck, J. and W. Nicholls, Furniss, Vogel, Pritchard, Coles (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—The meeting was held at the homestead of the President, Mr. W. H. Hughes. Inspection of a fine growth of chestnut trees was made, and the wattle and pine plantation was examined. It was explained that pines when grown close to wattles grew faster, tended more to straightness, and threw out less branches from the stem than when grown otherwise. Members thought the aim in growing pines should be to produce straight trees with few branches. Some expressed the view that growing the trees too close together would prevent their maturing, and they would not provide wide planks for timber. Mr. Hughes said when the wattles were removed the pines would develop into large trees. Generally pines were planted very thickly, consequently

they required thinning out, which meant expense. With the thinning out of wattles, a very payable return was received. When planting young pines it was necessary to tie to a stake, to prevent them from being blown down.

Uraidla and Summertown, September 4.

(Average annual rainfall, 42½ in.)

PRESENT.—**MESSES.** HAWKE (chair), Richardson, Rowe, Johnson, Pappin, jun., Dyer, Day, Prentice, Kessell, Cobbledick, and Snell (Hon. Sec.).

RASPBERRY-GROWING.—The following paper was read by Mr. Prentice:—"Raspberries, which are grown a good deal in this district, are a very popular jam fruit. Large quantities are bought privately and made into jam, but the bulk of them are taken to the factories, where they are pulped for the time being. Small blind gullies are considered the best situations for raspberries; that is, where they are sheltered from all north-east, north, and west winds, and have a heavy background of trees to shelter them. In these gullies, with fair weather conditions and good attention, they very seldom fail to crop. They can be grown nearly as well on the sloping hillside, provided they are sheltered from these winds, and are grown on the hillside facing the east of south, and well sheltered, if possible, from the afternoon sun. On no account should they be planted on the hill-sides facing the afternoon sun, and where they would catch a hot north wind. The grower who gets a crop from a bed in that situation in my opinion is a lucky man. When preparing the land it should be broken to a depth of about 18 in. It should then be well forked through so that it is nice and loose. The raspberry bushes may then be planted in small holes with a good handful of bonedust well mixed with the soil. I prefer planting with a space of 5 ft. by 4 ft. within the row, although some growers plant them closer and some further apart. Many of mine are closer. They bear just as well, but the fruit is not so easy to pick. Strong suckers one year old should be planted about six to eight in a bunch. With proper attention good canes should be thrown from these, and the following year a fair crop should be picked from them. I prefer the variety known to us as 'the old sort' for land that is high up and liable to be dry. On low land that keeps nice and moist I prefer the Full Basket, which is a larger raspberry and a prolific cropper in suitable land. With proper care and attention a raspberry bush should each year throw approximately a dozen canes. I prefer them in the open from 5 ft. to 6 ft., or among trees about 4 ft. There is no limit to the productive age of a raspberry bush. The bushes in most of my beds are well over 50 years of age, and they do just as well as some I have planted during the last few years. About August I make a start at clearing the bed of the old canes. By breaking the canes instead of cutting them you keep the bush well clear of all rubbish. Grass is liable to get a footing in among the pieces left after cutting, whereas if they are broken off all this is well cleared away and the bush looks far cleaner. With the old canes cleared out and burnt I proceed to tie the canes up. I prefer tying to any other principle as the crop is better to pick, and does not get in the dirt. I tie all canes 6 ft. and under. In tying them I slip the string around one cane, cross it then around the bush, tying on the opposite side. When I have all the canes tied up I proceed to snip off the tops of the canes. I consider a bed of raspberries should run about the same height, say 6 ft., 5 ft., or 4 ft. throughout. They are then nice and level, and the shoots grow from the bottom to the top of the bush. The top berries ripen first, and so on down the bush. They ripen in December, and picking lasts about one month. Where the canes are above 6 ft. high I bow them, crossing one-half of each bush. My reason for so doing is if they are tied when straight up you have to cut too much off the shoots. They are forced and become too strong. The bush becomes top heavy and has to be staked, or it will fall. I then proceed to dig, throwing a handful of bonedust (not too much where they are strong, or you will get more foliage than fruit) about the middle of the space between the bush, if on the flat. If on a hillside place it about a foot above the bush. They are now nice and clean, and in about the middle of November I go through the beds with a good sharp hoe to kill all weeds, &c. In December they are ready to pick, and should always be kept well under, or picked up close, as two or three warm days ripen them very rapidly. They then get ahead of you, and you may lose part of your crop through not keeping them well under in the first place. I prefer sending them to market in clean buckets nicely painted, so that they do not stick to the bucket, placing about a dozen pounds in a bucket." In the discussion which followed it was mentioned that some of the buckets in which raspberries were taken to the factories were not fit for use. Objection was also taken to the practice of suppliers taking other suppliers' clean buckets instead of their own dirty ones.

Willunga, September 4.

(Average annual rainfall, 25½ in.)

PRESENT.—Messrs. Pengilly (chair), Bigg, Blacker, Binney, and Hughes (Hon. Sec.).

MIXED FARMING.—The report of the Morphett Vale Branch, published in the *August Journal*, was read, and the paper on "Mixed Farming" was criticised. Members agreed that the writer's figures were rather optimistic. Only a good farm could produce such results. The Chairman, who had a farm of 240 acres, most of which was beautiful land, stated that at the present time his farm was carrying 210 ewes and lambs, 13 horses, eight cattle, five brood sows and a boar, 26 suckers, and poultry, 50 acres of wheat crop, 20 acres peas, 17 acres experimental plots, 20 acres fallow, and 60 acres permanent grass land (a hillside and liable to drift). Last year, from June to October, Mr. Pengilly carried 210 ewes and lambs (80 lambs) on 28 acres. Members considered he was making very good use of his land. In the light of this information Mr. Perry's estimates were thought to be not unreasonable. By growing crops for feeding off a very much larger number of stock could be carried on farms in the south than was now the case. Besides being a source of direct profit the land would be improved by the droppings and better crops obtained—a gain to the farmer every way.

SOUTH-EAST DISTRICT.**Keith, August 12.****PRESENT.**—Messrs. Morcombe (chair), Makin, Dall, Leishman, Schultz, C. and J. Godely, Lock (Hon. Sec.), and two visitors.

PIG-RAISING.—A paper, written on this subject by Mr. Fulwood, was read by Mr. Dall. The first essential in rearing pigs, the paper said, was the provision of good sties. Sties, 8yds. square, made of stone and upright timber, with small paddocks planted with turnips, rape, and peas were required. For breeding sows, 8ft. x 12ft. was large enough. A cross between the Berkshire and Essex or Chester White yielded the best porker. The best bacon pig was the resultant progeny from a cross between the Berkshire and Tamworth. Young pigs should be castrated when they reached the age of from three to four weeks. If they are provided with milk and a little grain outside the sty, less trouble is experienced in weaning when they reach the age of about seven weeks. After the pigs have been away from the sow five days, put the boar with her. Pigs require warmth in winter and cool quarters in summer. Give them as much water as they will drink. Do not give skim milk fresh from the separator to young pigs; it is aerated and acts deleteriously on them. Do not keep your pigs in confined places. Do not feed solely on maize, as pigs so fed do not command the price that pea-fed pigs do; the bacon from maize-fed pigs rapidly turns rusty. In discussing the subject matter of the paper members expressed the view that it was advisable to keep pigs regardless of the market price. A cheap feed for these animals could be made by soaking cocky chaff for 24 hours and then mixing it with pollard.

Keith, September 9.**PRESENT.**—Messrs. Lambert (chair), Morcombe, Leishman, Williams, Makin, Schultz, Hutchings, Dall, and Lock (Hon. Sec.)

FARMING IN MALLEE COUNTRY.—Mr. Hutchings read a paper, in which he said that for clearing light mallee land a roller drawn by horses was most suitable, but where the growth was heavy bullocks were more useful, as they got through the timber better,

and were not so liable to get staked. Rolling was best carried out in spring. The area rolled should be restricted to the amount that could be brought under cultivation, as if shoots were allowed to come up on rolled land a great deal of inconvenience would result. A farmer with 600 acres of mallee land, with one team, would do well to restrict his clearing to 200 acres, which area could be cropped for two or three years in succession. When ploughing it was advisable to alternate the direction yearly, as this practice tended to cut the roots of any stumps remaining. Sow heavily the first year, and if possible burn the stubble. A further 100 acres could be cleared the second year, and 100 acres of the first year's clearing could be sown with oats. The third year another 100 acres could be sown with wheat, and the 100 acres on which oats were sown could be left out. The fourth year the 100 acres left out during the third year could be fallowed. After the fifth year the whole area should be under cultivation, and could be worked 200 acres in crop, 200 acres in fallow, and 200 acres in grass. Overstocking should be avoided, and if shoots appeared a grass fire would be found effective. A few sheep would keep the fallow clean. For fallow the land should be worked to a depth of 3½ in. to 4 in. and well harrowed down. Early fallow encouraged the growth of weeds, which could then be destroyed before harvest. Shoots should be cut rough, as they then decay more quickly. In the event of the appearance of takeall oats should be sown before leaving the land out. The appearance of this disease was very frequently due to dry working.

Kybybolite, September 7.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), G. H. and C. Hahn, Lacey, Smith, Pettitt, Colebatch, Scott, Scholz, Anderson, Schinckel, and Scholz (Hon. Sec.).

HORSE-BREEDING SOCIETIES.—Mr. Colebatch addressed the meeting on the aims and objects of the horse-breeding society scheme, proposed by the Director of Agriculture. Whilst members expressed an opinion in favor of the proposal, they did not see their way clear to form a society at the present, although they hoped to do so in the near future.

Lucindale, August 19.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. Rayson (chair), Secker, Revett, McInnes, Dow, Johnston, McMorrow, Feuerherdt, Beaton, Carmichael, Langberg, Secker (Hon. Sec.), and five visitors.

IMPROVEMENT OF BUREAU CONFERENCES.—The following extracts from the report of the delegate of this Branch to the Conference held at Naracoorte in March, although so belated, are printed because they may be of some value to members of Bureaux in arranging future engagements of this nature, while others may desire to express their opinions concerning the matter.—Ed.] :—"Some of the papers read should never have occupied the time of the Conference, and I would suggest that in future conferences either the papers should be submitted to the general secretary before being added to the agenda, or that addresses be left entirely in the hands of officers of the department. This would give more time for discussion, and would lead to better results. If every member provided an exhibit, i.e., samples of wool, fruit, honey, preserves, it would help. Some Branches had nothing; some had good collections. Every Branch should make a feature of its exhibits, and let it be a strong feature. More good would accrue from these conferences if they could be extended over two days, and if delegates could be taken out to homes of members, and could there interchange ideas in the same way as has been arranged at Lucindale conferences. If it is not possible to have two-day conferences, I would suggest that the preliminary work of the Conference be proceeded with the night before the Conference proper takes place. The next Conference is to be held at Kingston. I would suggest that the Conference be opened at night on arrival of the delegates, say from 8-30 p.m. to 10 p.m., and that the next session be on the following day at 10 a.m. It is generally after 11 a.m. before a start is made, and before the preliminary work is finished lunch time has arrived. The same thing could be done, say, at Penola, Mount Gambier, Lucindale, and Naracoorte. At present no time is given for criticism of papers or interchange of ideas, and for the latter a time should be set apart on the agenda."

Naracoorte, September 9.

(Average annual rainfall, 22in.)

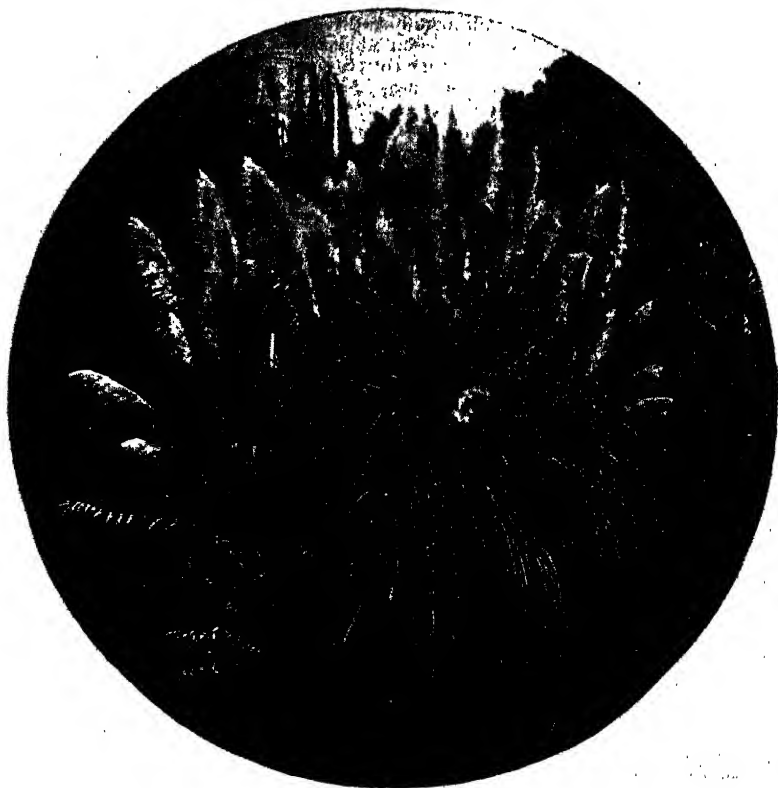
PRESENT.—Messrs. L. Wright (chair), R. and J. Tolmer, Williams, Coe, Loller, Caldwell, Langeludecke, Rogers, and Schinckel (Hon. Sec.).

ROTATION OF CROPS.—Mr. W. E. Rogers read the following paper on the "Rotation of Crops":—"This subject is, I consider, one of the most important branches of agriculture, and one that is deserving of much greater attention than it receives at the hands of the average farmer. Probably the reason that it is so little practised is that the market value of particular crops causes the more frequent recurrence of those which bring in the best and quickest returns. Take wheat, for instance, for which there is always a demand, even though at a low price, whereas with many other crops the market becomes glutted, and there is practically no demand or sale for their produce. The principal object in adopting a rotation is to keep the land in good heart, the theory being that each crop takes some ingredient in larger quantities than other crops, and that a succession of different crops draws on the resources of the soil in a more equal manner. We know from experience that the continual growing of one crop after another of the same kind greatly reduces the fertility of all classes of soil, and experience has also taught us that one crop after another of a different kind does not reduce the fertility of the soil to anything like the same extent, so that the conclusion we arrive at is that the fertility of the soil is best maintained by growing different crops after one another. Though all crops derive their support from the soil, one kind appropriates food in a different degree to another, and even the same crop takes food in different quantities, according to the state in which it is allowed to grow. Different crops are grown for different purposes. One class is cultivated for grain, such as wheat, oats, barley, rye, &c., another for their roots and leaves, such as turnips, mangolds, kale, &c. It is obvious that every plant that is allowed to grow ripened seed takes more out of the soil than that which only grows roots and leaves, so that any cereal crop impoverishes the soil more than root crops, but if green crops are allowed to go to seed they take still more out of the soil because they are drawing on its resources for a longer time. Crops of different kinds ought, as much as possible, to alternate with one another. Should it be necessary to return to the same class of crop a different member of it should be sown. For example, instead of immediately putting in wheat when another cereal is required it would be better to sow oats or barley, and to substitute turnips or some other root for mangolds. It is almost impossible to lay down any hard-and-fast rule for rotation, because the succession of crops that would answer well in one class of soil would be a failure in another, but to put the grain crops in the order of their probable power of exhausting the soil I would place them as follows:—Wheat, rye, barley, and oats; and the root crops—carrots, swede turnips, and mangolds."

VEGETABLES.—Mr. S. H. Schinckel read the following notes on vegetable-growing for 'September':—"No time should now be lost in planting out the last of cabbages and cauliflowers for the season. These cannot well be grown in the dry and warm weather without a large quantity of water. Continue sowing red beet, parsnips, turnips, and radishes. Lettuce may still be sown where required to be growing; if transplanted they are more likely to go to seed. As the weather warms they may require watering and forcing. There is no reason why a few peas should not still be sown for a chance crop. Those who intend planting onions and potatoes should do so without delay. By the end of this month where water is plentiful, and a good protection from bleak and cold winds, cucumbers, French beans, tomatoes, melons, all kinds of pumpkins, marrows, and squashes may be sown, but I prefer waiting till October. There is no need to transplant tomatoes; these may be sown where required to grow. Cucumbers are best sown in a hole made very rich with old manure. Sow or put in a few roots of parsley, also thyme, sage, and marjoram. In your growing beds of vegetables previously planted, keep the surface soil well stirred and weeds destroyed by the frequent use of the hoe." Mr. Coe thought September was too late for cauliflowers and cabbages. Mr. Schinckel said in some seasons it was too late, but in other seasons it was not. If it turned out dry they would have to use water. Mr. R. D. Tolmer pointed out there was summer cabbage, for which warm weather was suitable. The Chairman said cabbage could be grown where water was laid on, but he had never known the plant to do well unless watered during summer. Summer sorts required watering as well as others. Mr. Loller said that with the quantity of water in the South-East it would grow everything all the year round. He had grown good cabbages during summer, but of course he had to use water. He advised levelling the ground well, and running the water between the rows of plants, and not to raise the earth round the plant. Mr. J. D. Tolmer said he had grown drum-head cabbage in summer with water. They had grown an immense size in leaves, and the heart was very good;

but he found they became blighty through continual watering. Mr. R. D. Tolmer mentioned that slugs were a great drawback to vegetable-growing this year.

ROLLING PEAS.—Mr. Rogers inquired if rolling peas when they were 2in. or 3in. high would injure them. He desired to level the soil for mowing. Mr. Loller said he had had experience of rolling peas, and he found it crushed them. If a large roller were used the damage would not be so great. A long discussion ensued as to whether a large roller gave more weight than a small roller. Mr. Loller contended that the large roller was better for the crop, because the weight was distributed over a greater area and the rolling surface had not such a sharp curve as with the smaller one.



AGRICULTURAL PUBLICATIONS.

The following publications have been issued by the Department, and are available for distribution at prices mentioned:—

“Pruning of Fruit Trees,” by Geo. Quinn, 1s. 3d.; posted, 1s. 4d.
“Vinegrowers’ Manual,” by A. Sutherland, 6d.; posted, 7d.

Reports of Conferences of Australasian Fruitgrowers held at Brisbane and Wellington, 1s. each; posted, 1s. 1d.

Journal of the Department of Agriculture of South Australia, 1s. per annum in advance to those resident in South Australia; 3d. per copy; and 2s. 6d. per annum in advance to those outside the State.

Any of the following Bulletins and Leaflets may be obtained by sending a penny stamp for postage:—

Agricultural, Miscellaneous: Reports of Agricultural Experiments; Bunt Tests; Roseworthy College Harvest Reports; Amount of Spirits to be Extracted from a Ton of Raisins; Lucerne Hay; Reports on Agricultural Bureau Congress; Irish Potato Blight; House-building in New Districts; Reports on Permanent Experiment Field; Reports on Roseworthy Farm Flocks; Noxious Weeds; Milling Characteristics of Australian Wheats; Milling Qualities of South Australian Wheats; Lucerne Cultivation; Trial of Stone-Gathering Machines; Hints for Intending Irrigationists; Two Blue Weeds; Inquiry into South-Eastern Conditions; Milling Experiments.

Horticulture: Bordeaux Mixture and other Fungicides; Fruit-preserving for Domestic Supplies; Fruit-drying in California; The Codlin Moth; Fruit-drying for Beginners; Fruit Flies; Fruit Maggot-fly Pests; Cider-making; Defects in Export Apples; The Apple Mussel Scale; Select List of Fruit Trees; Preserving, Canning, and Drying Fruits; Plums and Prunes; The Lemon in Sicily; Some Notes on Almonds; Gumming Disease of Peach and Almond Trees; Curculio Beetle; Production of Early Tomatoes; Fertilization of Orchard Lands; Spraying against Codlin Moth; Popular Remedies for Common Diseases in Fruit Trees.

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Poultry: Reports of Egg-laying Competitions; Single Testing for Egg Production.

“The Poultry Manual” can be obtained by sending 7d. to the Government Printer, Adelaide.

The Journal of Agriculture each month contains items of interest in regard to poultry-raising.

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J. P. WILSON,

MINISTER OF AGRICULTURE.

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All communications to be addressed:

"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Adelaide Wool Sales.

The third wool sale of the Adelaide series was held at the Wool Exchange on Monday, October 23rd. The bidding was animated, and there was more general competition than at the second sale. For good wool prices were firm, but they could not be quoted as being higher. Farmers' lots were easy, but this may be accounted for by the fact that many of them were burry. Taken all round the market was practically unchanged. The bales offered totalled 24,132, and of this number 22,806 were sold.

New Lands.

The Moorak lands, near Mount Gambier, have been allotted. Two survey parties are now at work at North Bundaleer Estate. The survey in the hundreds of Vincent and Wilson is almost completed and the lands will be gazetted within a few weeks. Surveys are proceeding rapidly on the Darke's Peak line. Another survey party has been dispatched to Eyre's Peninsula on work near Minnipa Hill, the terminus of the authorised railway from Port Lincoln. Commonage lands at Tantanoola in the South-East are in course of survey, and when this is completed they will be offered.

Milk Records.

In view of the address at the recent Agricultural Bureau Congress by the Director of Agriculture (Professor Lowrie) in regard to the necessity of farmers keeping milk records if they desire to build up their dairy herds, the following extract from the *South African Agricultural Journal* is of interest:—"If there is one thing more necessary than another in connection with the dairy industry of South Africa, and which is of really paramount importance, it is the question of milk records. . . . At odd intervals we hear of cows with phenomenal milk production, but what we never hear of is the careful selection of the progeny of such animals with the view to producing a tribe with similar tendencies. . . . People are apt to forget that everything must have a beginning, even the foundation of a great milking family of cattle. And it is to such animals as are now frequently forgotten that the world owes its greatest breeds of milking stock. Their records are carefully kept and registered year in and year out. The records of their progeny are registered in the same manner and by scrupulous rejection and selection the herd is built up. In other words, what the racecourse is to the thoroughbred

horse the milk pail is to the best breeds of cattle ; but the records of the milk pail must be as carefully kept as are those of the racecourse. This is a question not only for every dairy-farmer, but every cattle-farmer to carefully ponder."

The Demand for Land.

In his report for last financial year the Surveyor-General states that the demand for land is unabated, and that difficulty has been experienced in meeting the needs of applicants. The area of Crown lands surveyed during the year was 645,780 acres into 380 blocks at an average cost of 3½d. per acre, most of the land being situated in the Loxton and surrounding districts. but 150,000 acres are in the West Coast districts. "About 168,000 acres in the vicinity of Arno Bay will be offered for settlement shortly, and surveys are being made along the route of the proposed railway to Darke's Peak. A large area is also under survey on the authorised line from Tailm Bend to Brown's Well. The average number of survey parties in the field during 1910-11 was eight, but this number is now being increased to 16, so that the area surveyed should be correspondingly greater than last year. It is estimated over 1,000,000 acres will be made available for offer during the coming year."

American Apple Crop.

The Californian Fruitgrower reports that, notwithstanding the damage caused by the long spell of dry weather experienced in the Atlantic and eastern States of America, the apple crop, on the whole, promises to be very much in excess of the 1910 crop, which was, however, a short crop. The present season's crop of apples is expected to be the best for several years, and Nova Scotia and Ontario advise that probably this year's shipments will be double those of last year.

Californian Dried Fruits.

Judging by the high rates ruling in California there is a very serious shortage in most classes of drying and canning fruits. Bartlett (W. B. C.) pears are being purchased at the factories at 6s. to 9s. per hundredweight, apricots at 11s. to 13s. Prunes are ruling at high rates owing to general shortage in the crops, not only in America, but also in Europe. In almonds the reports from Italy, Spain, and Sicily indicate small crops and advanced prices generally.

Closer Settlement.

The Surveyor-General (Mr. E. M. Smith) in his annual report states that during the year ended June 30th last the following estates were repurchased for closer settlement:—Moorak, 4,604 acres; North Booborowie, 32,584 acres; Struan, 22,341 acres; Wirrabara, 1,580 acres—making a total of 62,200 acres. The purchase-money amounted to £439,991. In addition, 9,037 acres were repurchased in the hundred of Burdett for the purpose of being subdivided into blocks for grazing and cultivation in order that the settlers at Monteith and Long Flats might have an opportunity of obtaining high land on which to grow cereals and graze their stock. The cost of the area was £8,133. The total area repurchased during the year was, therefore, 71,237 acres, at a cost of £448,124, and the aggregate repurchased for closer settlement to the end of the year was 570,052 acres, for which £1,671,915 was paid. Apart from that land an area of 22,919 acres was repurchased for reclamation work at a cost of £60,703, making a grand total of 592,972 acres at a cost of £1,732,618. Of this, 469,434 acres have been allotted to 1,566 persons, the average holding being 300 acres. "Prior to the Government repurchasing the estates," says Mr. Smith, "it is doubtful whether the population on the land exceeded 400 persons, while the stock on the whole area at the time of purchase numbered about 286,000 sheep and about 2,600 horses and cattle. On June 30th the population of the repurchased lands still held under agreement and lease from the Crown was 4,528, including children, while the stock numbered 120,000 sheep and about 14,400 horses and cattle. The total value of the improvements effected exceeds £270,000."

Supplies of Vegetables for United States Army.

The following information regarding supplies of vegetables required from time to time by the U.S.A. troops in the Philippines has been forwarded by the Commonwealth Department of Trade and Customs to the Department of Agriculture:—The British Consul-General, Manila, states that from time to time tenders are called for large supplies of fresh vegetables which are required for the use of the United States Army in the Philippines. The requirements generally run into about 600,000lbs. of potatoes and 120,000lbs. of onions per month. As the time for the receipt of tenders is generally rather short, the Consul advises that intending bidders might have to arrange telegraphically, to do which they would require some firm to act as their agents, and he appends the names of three firms who might be willing to act, and from whom all particulars could be obtained. They are—Messrs. Castle Bros., Wolf & Sons, Plaza Moraga, Manila; Messrs. Hashim & Co., Escolta, Manila; Messrs. Stevenson & Co., Muelle del Rey, Manila.

Lincolnshire Curly-coated Pigs.

A limited number of Lincolnshire curly-coated pigs (weaners) are being offered at the Kybybolite Experimental Farm at prices varying from five to ten guineas. Farmers who wish to try this breed should apply to Mr. Colebatch, at the Farm.

Pastoral Lands.

"The past year," comments the Surveyor-General in his annual report, "was a good one on the whole for pastoralists. The wool clip yielded 56,654,831 lbs., the value of which was £1,943,455, or approximately 5½d. per pound. The clip was heavier than that of the previous year, but the price obtained was about 1d. per pound less than during the former period. The number of sheep has not increased to any great extent, sales and exports probably accounting for this. The lambing for the present year will not, in all probability, be as good as that for last year, when the average was about 80 per cent., and it is questionable whether the return for 1911 will average more than 70 per cent. to 72 per cent. Although a much higher percentage may have been shown by the marking, owing to the dry weather since the losses have been considerable, and but for the fact that a large area of country is now enclosed with vermin-proof fencing the percentage would have been much less. In the pastoral country about 4,155 miles of vermin-proof fencing has been erected by vermin boards, and about 850 miles of similar fencing has been erected by lessees of the pastoral lands. The area of pastoral land applied for and allotted during the year was small, notwithstanding the fact that about 13,605 square miles once held and stocked have been open to application for some years at low rental. About 130,000 square miles of unoccupied country is available for offer, and it is intended shortly to gazette a considerable area of this country open to application under lease. Should artesian waters be obtainable over any of the land in question, it is more than probable that the whole of it will be applied for."

South Australian Wheat and Flour.

Writing with reference to the annual show in connection with the bakers' and confectioners' trades which was opened at the Agricultural Hall, Islington, on September 2nd, the Acting Trade Commissioner in London states—"Space was secured by the late Trade Commissioner for an exhibit of South Australian wheat and flour. Small bags and sacks of wheat and wheat in ear were exhibited, in addition to which some dried and bottled fruits and wines were added to improve the display. The South Australian display was very effective. The cleaned wheat exhibited in sacks has been much

admired by numerous visitors to the show. I had inquiries from bakers and others respecting the possibility of obtaining supplies of South Australian flour, and I believe that a very great increase in the export of flour to Great Britain could be made if some action were taken to properly advertise the flour. It should prove very beneficial, both for the miller and his employes and to the users of wheat offal, if a larger proportion of wheat could be milled into flour in the State. Following on the suggestion of the late Trade Commissioner, made in his despatch of 17th March last, it seems to me that from the interest exhibited by visitors to the show in this question that a very large trade in flour is only waiting effective exploitation. I think there can be no doubt that if South Australian flour were graded and analysed under Government supervision, and shipped with a Government guarantee as to its ascertained constituents and quality, it would not be long before a considerably increased trade would arise, especially if trouble were taken to advertise in a thorough and effective manner."

Pinnaroo Lands.

"The whole of the land," states the Surveyor-General in his report, "surveyed within the schedule to the Pinnaroo Railway Act, 1903, has been taken up, and a large and prosperous population is now settled in the district. The total area held under lease and agreement and in fee simple on July 1st was 829,708 acres. Purchase has been completed of 377,398 acres at a cost of £119,643, an average of 6s. 4d. an acre. The purchase-money for the land now held under agreement to purchase is £165,090, an average of 7s. 7d. an acre. The annual rental on the leased land allotted prior to the passing of the Act is £113. The total area held under agreement and lease is 452,309 acres. Last season the area under cultivation was 180,928 acres, and the quantities of grain and hay produced 1,841,159bush. and 17,199 tons respectively. The year has been a heavy one for the Land Board on account of the increased number of applications for land, and the large number of right of purchase leases expiring on which rent and purchase-money had to be fixed for renewal. The applications received for land totalled 3,151—about 500 more than in the previous year—and 1,825 applications to transfer leases and agreements were also dealt with. The cost of the board was £830, and the total cost of land boards from February, 1889, to June 30th last was £59,942. The main features of the land allotted between July 1st, 1910, and June 30th, 1911, may be summed up thus—Number of agreements to purchase, 303; area, 220,748 acres; purchase-money, £173,916. Perpetual leases, 333; area, 475,286 acres; annual rent, £3,067. Miscellaneous leases, 88; area, 38,301; annual rent, £400. The total arrears of rent on Crown lands at the end of the year were £4,239, and the arrears of instalments for land and on improvements, £4,313."

Analyses of Arsenates of Lead and Lime.

The following table gives the results of the analyses made by the Government Analyst of samples of arsenates of lead and lime purchased by the officers of the Horticultural Branch of the Agricultural Department this season in Adelaide. The figures shown under columns for moisture, total PbO, total As_2O_5 , and water soluble As_2O_5 , represent the percentages on the paste after pouring off the free water from the top of the paste:—

LEAD ARSENATES.

Weight Water Poured Off.	Weight of Paste Analysed.	Moisture.	Total PbO	Total As_2O_5 .	Water Soluble As_2O_5 .	Brand.	Seller.
$\frac{1}{2}$ oz.	2lbs.	49.74	35.34	14.84	0.20	"Swift's"	Aus. Impl. Co., North Terrace
$2\frac{1}{2}$ ozs. ..	1lb. 13ozs.	45.64	35.74	12.15	0.12	"Blushell"	Geo. Wills & Co., Grenfell Street
4ozs. ..	2lbs.	41.81	39.39	14.96	0.17	"Federal"	E. B. Cox & Co., Rundle St. E.
—	1lb.	8.42	41.58	11.80	0.11	"Disparene"	E. B. Cox & Co., Rundle St. E.
—	2lbs. $\frac{3}{4}$ oz.	38.05	39.73	19.95	0.10	"Electro"	E. B. Cox & Co., Rundle St. E.
—	1lb. $15\frac{1}{2}$ ozs.	54.03	28.90	15.04	0.21	"Hemingsways"	Aus. Impl. Co., North Terrace
—	1lb. $14\frac{1}{2}$ ozs.	52.54	31.76	14.73	0.11	"Our Jack"	Prevost & Co., Currie Street

LIME ARSENATE.

Weight Water Poured Off.	Weight of Paste Analysed.	Moisture.	CaO.	Total As_2O_5 .	Water Soluble As_2O_5 .	Brand.	Seller.
—	1lb. 2ozs.	55.05	15.41	16.90	0.46	"Paragon"	F. H. Nicholls, Grenfell Street

Changes in British Agriculture.

In an article dealing with the condition of British agriculture in the first decade of the twentieth century, as compared with the last decade of the nineteenth, *The Journal of the Board of Agriculture* writes as follows:—"Summarising briefly the principal points, it may be said that as regards area the figures show a reduction of the cultivated land of the country by about half a million acres in the course of 20 years; the loss of about $1\frac{1}{2}$ million acres of land under arable cultivation being only partially compensated for by laying down a million acres to grass. The acreage of corn crops has been substantially reduced, but the area of potatoes has been maintained, and indeed increased,

while fruit cultivation has extended very markedly. The crops of the decade 1901-10 were on the average considerably better than those of 1891-1900, and consequently the effect of reduced acreage on total supplies was somewhat diminished. Cattle increased in numbers, cows and heifers more largely than other classes, though the increase was only small, and represented, in relation to the growth of population, a serious falling off. Attention is directed to the significance of the failure of the milking herd of the country to keep pace with the steady increasing demand for milk. Notwithstanding a reduction in the total number of sheep in the country, the maintenance of the stock of ewes indicates that sheep-breeding fairly held its own, though not if considered in relation to population. The numbers of horses and pigs also did not greatly change in the two decades."

Imports and Exports of Plants.

During the month of October 10,140bush. of fresh fruits, 162pkgs. of cucumbers, 3,071 bags of potatoes, 85 bags of onions, and 25pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act, 1885; 503bush. of bananas (chiefly over-ripe) were destroyed. At Mount Gambier 517 bags of potatoes were inspected and admitted from Victoria, while 214 bags potatoes affected with disease were rejected. Under the Federal Commerce Act 868 cases fresh fruits, 49pkgs. preserved fruit, 867pkgs. dried fruit, 200pkgs. of honey, 45pkgs. peas, and 3pkgs. plants were exported to oversea markets during the same period. These were distributed as follows:—For London, 24 cases oranges, 100pkgs. honey, and 25pkgs. peas; for Germany, 100pkgs. honey; for New Zealand, 844 cases citrus fruits, 850pkgs. dried fruit, 20pkgs. peas, and 3pkgs. plants; for India and East, 17pkgs. dried fruit, and 49pkgs. preserved fruit. Under the Federal Quarantine Act 598pkgs. plants, seeds, bulbs, &c., were admitted from oversea sources.



Hayfield near Adelaide.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the enquirer must accompany each question. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

EFFECT OF MUSTARD ON MILK AND BUTTER.

"A. M. D." asks—" (1) Will wild mustard make bad milk and butter; if so, will garden mustard have the same effect? (2) Would linseed meal scalded with boiling water and mixed with milk be as good for calves as linseed boiled? (3) Would linseed meal fatten a poor cow or be good for her? Would it flavor the butter?"

Answer—(1) Wild mustard and garden mustard, when fed to dairy cows, will both slightly taint the milk and butter produced by them. The taint may be almost wholly removed by heating the milk quickly to a temperature of 175° Fahrenheit, and rapid cooling to, say, 58°; this is known as pasteurisation and is hardly practical on the farm. (2) Linseed meal scalded with water is not as good as boiled linseed for mixing with skim milk to be fed to calves. It is recommended that the ground linseed be boiled; the ground linseed contains, like linseed, approximately 33 per cent. of fat, which is readily digested by the calves. (3) Linseed meal will certainly improve the condition of a poor cow, but whole linseed ground is infinitely better. Feeding linseed will not result in taint to the milk, cream, or butter.

POORNESS OF YOUNG PIGS.

"Morphett Vale" writes—"I have a sow with a litter of 10 pigs, which I am feeding on rich food. The sow is getting very fat and the young ones are going back in condition instead of improving. Can you give me any advice on the matter?"

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"The sow was evidently fed on a diet rich in proteids. An excessive amount of protein in a ration for a sow with young is unnecessary. The food should be so arranged that there is a supply of proteids and carbohydrates in it for milk production and other purposes. Probably, if the sow got more exercise and less rich food the young would at once improve."

MANURES FOR MAIZE AND MANGOLDS.

"E. A. S." writes—" (1) What kind of artificial manure do you advise using for maize and mangolds on fairly rich alluvial soil, and how much to the acre? (2) Which is the best way to sow the maize?"

Answer—(1) Mangolds.—It is recommended that you use for this crop 1cwt. blood manure, 2cwts. of superphosphate, and $\frac{3}{4}$ cwt. of kainit per acre. This, comparing the dressings that are applied to wheat, will seem extravagant manuring, but you may be assured that for the mangold crop it is a light dressing, and you could put on nearly double these quantities with profit if the country be suitable for growing mangolds. The quantity of seed to sow is about 4lbs. to the acre, and then thin out the plants to 1cin. or 1lin. apart. (2) Maize.—It is recommended that you sue for the maize 1cwt. blood manure and 2cwts. superphosphate per care. Sow 30lbs. to 40lbs. of maize to the acre; you could sow it through the oat feed of the ordinary grain drill, though it will crack a few of the grains. The better way to do it probably, though a little more trouble, is to mix the manure and the maize seed, and sow the whole through the manure feeders of the drill.

FOUNDER IN HORSES.

"Novice" writes—"I shall be glad to have some information on the subject of 'founder' in horses—(1) Cause. (2) Effect. (3) Will boiled or soaked wheat cause it? (4) Treatment."

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Founder, or laminitis, will be described in detail in the series of articles now appearing in the *Journal of Agriculture*. (1) Causes are predisposing and exciting. Examples of predisposing—bad feet on heavy plethoric animals; examples of exciting—founder of engorgement of stomach with wheat; founder following foaling. (2) Congestion and inflammation of sensitive and vascular parts of the feet. (3) A superfluous feed of boiled or soaked wheat may cause it. (4) Remove shoes, give dose of laxative medicine, e.g., pint of raw linseed oil or mild physic ball. Apply cold poultices of bran, or place feet in puddle of clay, or allow horse to stand in running creeks. Feed on greenfeed and bran mashess."

BLACK MUSTARD.

"R. F. M.," Stansbury, writes—" (1) Has black mustard seed any market value in Adelaide? (2) Would the seed, or the leaves, when green, if fed to poultry, do them harm? (3) What is a fair average yield per acre?"

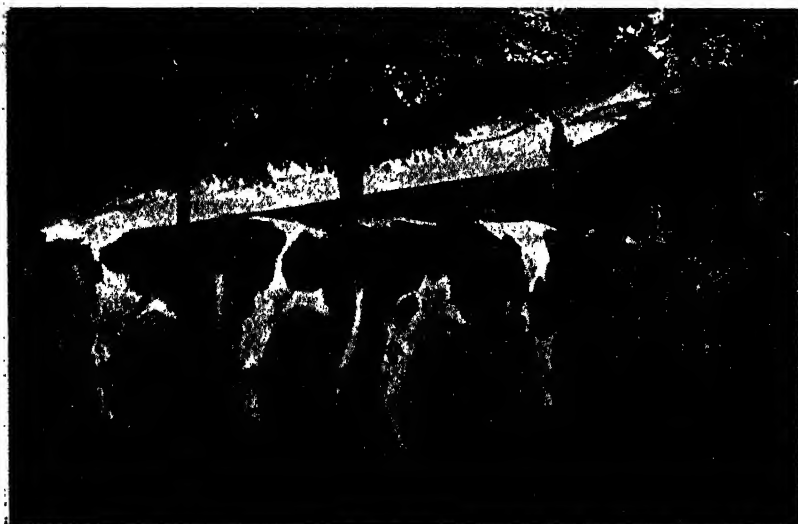
Answer—(1) As far as is known it would be difficult to place. There is no one known who purchases it at the present time. (2) Mustard, when green, is eaten by poultry and is a good greenfeed. (3) The yield per acre is a very variable quantity, and in your district it is not likely you could count on even

fair yields. Under very favorable conditions mustard will yield 15bush. to 20bush., but this would have to be discounted; the loss in harvesting is very great under our sun. It would be found also that your land would be fouled with the mustard seed for many years, as the seed would lie in the ground so long, being of an oily nature, and yet germinate.

SCOTCH THISTLE.

"R. F. M.," Stansbury, writes—"Is the Scotch thistle of any value as a honey-bearing plant where plentiful?"

Answer—This plant only bears a medium quantity of honey and pollen, and beekeepers do not place reliance upon it as a means of producing surplus honey. Where there are large quantities of it, it would undoubtedly assist the bees, but should not be relied upon as the principal source from which the beekeeper hopes to profit.



THE LAMB SEASON, 1911-12.

By G. A. W. POPE, General Manager, Government Produce Department.

Owing to the scarcity of good, early, soaking rains the present lamb season did not give promise of comparing favorably with last season, and the actual results up to the present have amply borne out this forecast.

The number of lamb and mutton treated for export up to the week ending Saturday, October 28th, amounts to 119,244, and shows a shortage of 45,049 carcasses when compared with the corresponding period last season. We expect the above figures will be increased by about 50,000 carcasses of lamb and about 20,000 carcasses of mutton before the close of the present season, but it is practically certain that last year's total will not be reached.

One of the reasons for the shortage this season is that while the lambs are in the State those that are offering are lacking the quality suitable for exporters. The largest quantity of lamb and mutton purchased by exporters at one market this year amounts to 5,636 compared with 10,876 purchased last year, and the largest total of lamb and mutton yarded at the market this year amounts to approximately 28,000 in comparison with approximately 30,000 for the preceding year.

Exporters are not operating so freely as producers would desire, but this is attributable to the lack of quality and some uneasiness as to the London market, which is depressed at the present through over-supply of home-grown meat, consequent upon the droughty conditions prevailing in Great Britain and upon the Continent. This abnormal supply will tend to keep prices fairly level for the season, but it seems certain that in the following season prices must be high because of the general shortage due to the killing this season of a very much higher percentage than usual of breeding stock. Graziers, however, are relieving the situation and there is a probability that the present position may be improved at a later period by the export of shorn lambs.

The arrangements made by the department for the receiving, slaughtering, and freezing of lambs submitted for export this season have been ample for all, and with the help of exporters the department has been able to spread out their daily killing so as to cover the whole week. The greatest number slaughtered on one day up to the present this season has been 5,918 carcasses.

ROSEWORTHY AGRICULTURAL COLLEGE.

Experiments Relating to the Depth of Sowing of Some Agricultural Seeds.

By ARTHUR J. PERKINS (Principal Roseworthy Agricultural College) and
W. J. SPAFFORD (Assistant Experimentalist).

(Continued from page 216.)

BARLEY.

Experiments similar to those already described for wheat were undertaken in connection with a six-row barley in 1906, 1908, and 1909. As in the case of wheat the barley was sown both in light sandy soil and in heavy clay loam: we shall pass in review first results secured in light sandy soil.

BARLEY IN LIGHT SANDY SOIL IN 1906.

As was the case with wheat, in this year only 10 grains of barley were placed at the several depths, ranging from $\frac{1}{2}$ in. to 6 in., with $\frac{1}{2}$ in. intervals. The unpickled grain was sown on June 6th. Germination results are summarised below in Table X.

TABLE X.—*Showing Germination of Barley Sown in Light Sandy Soil in 1906.*

Germination Order and Numbers.										
June.										Total Number Germinated.
Depth of Seeding.	12	13.	14.	15	16	17	18	19	20	
$\frac{1}{2}$ in.	6	3	1	—	—	—	—	—	—	10
1 in.	2	5	2	—	—	—	—	—	—	9
1½ in.	—	3	7	—	—	—	—	—	—	10
2 in.	—	—	5	4	—	1	—	—	—	10
2½ in.	—	—	—	4	5	1	—	—	—	10
3 in.	—	—	—	4	4	2	—	—	—	10
3½ in.	—	—	—	2	5	3	—	—	—	10
4 in.	—	—	—	—	6	3	—	—	—	9
4½ in.	—	—	—	—	3	2	3	1	1	10
5 in.	—	—	—	—	—	5	1	—	1	7
5½ in.	—	—	—	—	—	2	2	1	1	6
6 in.	—	—	—	—	—	2	2	1	—	5

On August 29th we noted that plants from seed sown $\frac{1}{2}$ in. deep had made poor growth; that the finest grown plants were those from seed sown 1in. to $1\frac{1}{2}$ in. deep; that plants from seed sown 2in. to 3in. deep were good; whilst plants from seed at greater depths were weaker, according as the depth at which they had been sown increased. On October 9th, whilst plants from seed sown respectively 1in., $1\frac{1}{2}$ in., 2in., $2\frac{1}{2}$ in., 3in., and $3\frac{1}{2}$ in. deep had already fully formed heads; those from seed sown respectively $\frac{1}{2}$ in., and 4in. to 6in. deep were only just coming out into head.

No grain could be saved from this series of experiments, as birds destroyed the bulk of it before it could come to maturity.

BARLEY IN LIGHT SANDY SOIL IN 1908.

In 1908, 50 grains of barley were sown on June 13th at the same depths as in the preceding year; germination results are shown below in Table XI. :—

TABLE XI.--*Showing Germination of Barley Sown at Various Depths in Light Sandy Soil in 1908.*

Depth of Seeding.	Germination Order and Numbers.																				Total Number Germinated.
	June.										July.										
	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	
$\frac{1}{2}$ in.	9	15	7	6	1	1	—	—	2	—	—	—	—	—	—	—	—	—	—	41	
1in.	—	7	10	22	9	—	—	—	—	—	—	1	—	—	—	—	—	—	—	49	
$1\frac{1}{2}$ in.	—	—	1	16	25	7	—	—	—	—	—	—	—	—	—	—	—	—	—	49	
2in.	—	—	—	—	12	28	3	5	—	—	2	—	—	—	—	—	—	—	—	50	
$2\frac{1}{2}$ in.	—	—	—	—	—	11	5	22	5	4	2	1	—	—	—	—	—	—	—	50	
3in.	—	—	—	—	—	—	3	22	9	10	2	2	—	1	—	—	—	—	—	49	
$3\frac{1}{2}$ in.	—	—	—	—	—	—	—	5	11	20	12	1	—	—	—	—	—	—	—	49	
4in.	—	—	—	—	—	—	—	—	3	20	15	5	—	2	1	—	—	1	—	48	
$4\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	1	5	30	8	1	—	1	—	—	—	—	46	
5in.	—	—	—	—	—	—	—	—	—	1	19	16	4	4	2	—	—	1	—	47	
$5\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	11	19	—	7	1	—	—	1	—	40	
6in.	—	—	—	—	—	—	—	—	—	—	2	6	6	6	5	1	1	—	—	27	

Depth of sowing appeared this year to have no influence on the period of bloom, all plants alike coming into flower on October 24th.

Birds again destroyed the bulk of the grain before it had come to maturity; hence harvest records are not available for this series. We have, however, been able to summarise in Table XII. the number of plants in this series which came to complete maturity, together with a statement as to the number of fully-developed ears they carried for each depth of sowing.

TABLE XII.—*Showing Partial Harvest Returns from Barley Sown in Light Sandy Land in 1908.*

Depth of Seeding	Number of Plants		Number of Ears Produced			
	Germinated.	Matured.	Large.	Small.	Total.	Per Plant.
$\frac{1}{2}$ in.	41	39	509	78	587	15
1in.	49	49	478	35	513	10
$1\frac{1}{2}$ in.	49	49	488	21	509	10
2in.	50	49	438	14	452	9
$2\frac{1}{2}$ in.	50	50	445	25	470	9
3in.	49	47	440	22	462	10
$3\frac{1}{2}$ in.	49	49	424	15	439	9
4in.	48	46	373	11	384	8
$4\frac{1}{2}$ in.	46	43	425	25	450	10
5in.	47	45	424	26	450	10
$5\frac{1}{2}$ in.	40	37	389	65	454	12
6in.	21	23	286	114	400	17

BARLEY IN SANDY SOIL IN 1909.

In 1909, 50 grains of barley were sown at the several depths on May 26th. Germination results are summarised below in Table XIII. :—

TABLE XIII.—*Showing Germination of Barley Sown at Various Depths in Sandy Soil in 1909.*

	Germination Order and Numbers.									
	June.									
Depth of Seeding.	6	7	8	9	10	11	12	13	14	15
$\frac{1}{2}$ in.	—	2	1	12	14	9	1	4	—	—
1in.	1	13	8	6	6	8	1	2	—	1
$1\frac{1}{2}$ in.	7	23	7	—	3	2	2	1	1	1
2in.	8	20	7	2	4	1	2	1	1	—
$2\frac{1}{2}$ in.	4	16	8	4	1	3	2	2	3	—
3in.	3	9	8	6	3	5	2	4	—	—
$3\frac{1}{2}$ in.	—	5	6	6	8	4	3	5	3	1
4in.	—	4	—	5	10	5	7	3	2	1
$4\frac{1}{2}$ in.	—	—	—	6	6	4	8	8	4	—
5in.	—	—	—	—	4	6	6	5	1	2
$5\frac{1}{2}$ in.	—	—	—	—	1	9	3	7	3	2
6in.	—	—	—	—	—	3	2	6	2	1

	Germination Order and Numbers.									Total Numbers Germinated.
	June									
Depth of Seeding.	16	17	18	19	20	21	22	23	24	
$\frac{1}{2}$ in.	1	—	—	1	—	—	—	—	—	45
1in.	1	—	—	1	—	—	—	—	—	48
$1\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	47
2in.	1	—	—	—	—	—	—	—	—	47
$2\frac{1}{2}$ in.	1	—	—	1	1	—	—	—	—	46
3in.	—	—	—	—	—	—	—	—	—	40
$3\frac{1}{2}$ in.	2	—	1	1	—	—	—	—	—	45
4in.	1	—	—	2	—	—	—	1	1	42
$4\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	36
5in.	4	—	—	—	—	—	1	—	—	29
$5\frac{1}{2}$ in.	1	1	—	—	—	—	—	—	—	27
6in.	3	1	1	1	1	—	—	—	—	21

The harvest results of this series were duly collected, and have accordingly been summarised below in Table XIV. :—

TABLE XIV.—*Showing Harvest Returns of Barley Sown in Light Sandy Soil in 1909.*

Depth of Seeding.	Plants.		Grain.		Total Produce.	
	Germi- nated.	Matured.	Total.	Per Plant.	Total.	Per Plant.
			OZS.	OZS.	OZS.	OZS.
½ in.	45	41	40	0·98	84	2·05
1 in.	48	43	40	0·93	84	1·95
1½ in.	47	44	48	1·09	88	2·00
2 in.	47	46	48	1·04	80	1·74
2½ in.	46	42	28	0·67	72	1·71
3 in.	40	35	24	0·69	52	1·49
3½ in.	45	39	44	1·13	88	2·26
4 in.	42	38	28	0·74	56	1·47
4½ in.	36	28	20	0·71	44	1·57
5 in.	29	26	16	0·62	40	1·54
5½ in.	27	21	16	0·76	32	1·52
6 in.	21	15	4	0·27	16	1·07

These 1909 yields show that, if we except the perhaps anomalous case of grain placed 3½ in. deep, the best yields, both as to grain and total produce, were secured from plants springing from grain sown 1½ in. to 2 in. deep.

SUMMARY OF THE GERMINATION OF BARLEY SOWN IN LIGHT SANDY LAND OVER THE THREE SEASONS.

The summary of the germination results, together with the average germination percentages for the three seasons, is shown below in Table XV. :—

TABLE XV.—*Showing Summary of Germination of Barley at Various Depths in Light Sandy Soil in 1906, 1908, and 1909, together with Average Germination Percentages.*

Depth of Seeding.	Numbers Germinated.				Average Germination Percentages.
	Out of 10.	Out of 50.	Out of 50.	Out of 110.	
	1906.	1908.	1909.	Total.	
½ in.	10	41	45	96	87
1 in.	9	49	48	106	96
1½ in.	10	49	47	106	96
2 in.	10	50	47	107	97
2½ in.	10	50	46	106	96
3 in.	10	49	40	99	90
3½ in.	10	49	45	104	95
4 in.	9	48	42	99	90
4½ in.	10	46	36	92	84
5 in.	7	47	29	83	75
5½ in.	6	40	27	73	66
6 in.	5	27	21	53	48

Attention may be drawn to the fact that with barley sown in light sandy land germination is satisfactory, and indeed normal, even when the seed is sown 4in. deep; and, further, that close on half the seed germinated when placed 6in. below the surface. It should be noted too, that very shallow seeding represented by half an inch, was not as satisfactory as deeper sowing, ranging from 1in. to 4in.

Deep sowing has the effect of retarding the appearance of the germinated seedling above ground; hence it appears to prolong the germination period. To what extent this was the case with barley sown in light sandy land is shown below:—

Plants from seed sown	$\frac{1}{2}$ in. deep	showed above ground	9 to 16 days after
"	1in.	"	" 9 to 17 "
"	1 $\frac{1}{2}$ in.	"	" 9 to 14 "
"	2in.	"	" 10 to 17 "
"	2 $\frac{1}{2}$ in.	"	" 11 to 18 "
"	3in.	"	" 11 to 17 "
"	3 $\frac{1}{2}$ in.	"	" 12 to 18 "
"	4in.	"	" 13 to 22 "
"	4 $\frac{1}{2}$ in.	"	" 13 to 18 "
"	5in.	"	" 14 to 22 "
"	5 $\frac{1}{2}$ in.	"	" 15 to 21 "
"	6in.	"	" 15 to 21 "

Finally, as it is of some interest to note the proportion of seed dying back after germination at the various depths, we have summarised in Table XVI. what data we have available on the subject.

TABLE XVI.—*Showing Percentage of Germinated Seeds of Barley Sown in Light Sandy Land that Matured at Various Depths in 1908 and 1909.*

Depth of Seeding.	1908.		1909.		Total Matured.	Percentage of Germinated Seed Dead.
	Germi-nated.	Matured.	Germi-nated.	Matured.		
$\frac{1}{2}$ in.	41	39	45	41	80	7
1in.	49	49	48	43	92	5
1 $\frac{1}{2}$ in.	49	49	47	44	93	3
2in.	50	49	47	46	95	2
2 $\frac{1}{2}$ in.	50	50	46	42	92	4
3in.	49	47	40	35	82	8
3 $\frac{1}{2}$ in.	49	49	45	39	88	6
4in.	48	46	42	38	84	7
4 $\frac{1}{2}$ in.	46	43	36	28	71	13
5in.	47	45	29	26	71	7
5 $\frac{1}{2}$ in.	40	37	27	21	58	13
6in.	27	23	21	15	38	21

Table XVI. shows that the percentage of seeds germinating, but subsequently dying back, was rather heavy in the case of very shallow sowing, represented by $\frac{1}{2}$ in.; that where the depth of sowing varied between 1 in. and $2\frac{1}{2}$ in. the percentage of plants not reaching maturity may be taken to be normal; that the percentage of plants dying back was heavier at greater depths, and particularly heavy at 6 in.

BARLEY IN HEAVY CLAY LOAM IN 1906.

In this season 10 grains of barley were sown at various depths on June 6th. Germination results are shown below in Table XVII. :-

TABLE XVII.—*Showing Germination of Barley Sown in Heavy Clay Loam in 1906.*

Depth of Sowing.	Germination Order and Numbers.																												Total Numbers Germinated.	
	<div> <div>June.</div> <div>July.</div> </div>																													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4										
$\frac{1}{2}$ in.	1	1	6	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10
1 in.	1	2	4	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10
$1\frac{1}{2}$ in.	—	—	6	1	1	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9
2 in.	—	—	2	1	—	2	1	—	1	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9
$2\frac{1}{2}$ in.	—	—	3	5	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10
3 in.	—	—	2	1	1	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6
$3\frac{1}{2}$ in.	—	—	—	—	2	—	3	1	—	1	—	—	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	8
4 in.	—	—	—	—	—	—	3	—	—	—	—	1	—	1	—	1	—	—	—	—	—	—	—	—	—	1	—	—	—	7
$4\frac{1}{2}$ in.	—	—	—	1	—	—	—	1	—	1	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	—	5
5 in.	—	—	—	—	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	5
$5\frac{1}{2}$ in.	—	—	—	—	—	—	—	1	—	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	—	—	4
6 in.	—	—	—	—	—	—	1	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3

On August 29th plants from seed sown $\frac{1}{2}$ in. deep showed the strongest growth, followed closely by those sown 1 in. and $1\frac{1}{2}$ in. deep; more deeply sown plants were generally weaker.

On October 12th plants sown $\frac{1}{2}$ in. deep were in full bloom; those sown 1 in., $1\frac{1}{2}$ in., 2 in., $5\frac{1}{2}$ in., and 6 in. carried fully developed but as yet unexpanded heads; whilst those sown $2\frac{1}{2}$ in., 3 in., $3\frac{1}{2}$ in., 4 in., $4\frac{1}{2}$ in., and 5 in. deep were only just coming into head.

BARLEY IN HEAVY CLAY LOAM IN 1908.

In this season, 50 grains of barley were sown at each depth on June 11th. Germination results are summarised below in Table XVIII. :—

TABLE XVIII.—*Showing Germination of Barley in Heavy Clay Loam in 1908.*

Depth of Sow- ing.	Germination Order and Numbers.																						Total Nos. Germi- nated.
	June.											July.											
	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	
½ in...	21	28	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50
1 in...	1	27	17	3	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	49
1½ in...	—	5	19	9	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	47
2 in...	—	1	1	—	21	11	11	2	2	1	—	—	—	—	—	—	—	—	—	—	—	—	50
2½ in...	—	—	—	—	2	5	20	9	7	—	—	2	—	—	—	—	—	—	—	—	—	—	45
3 in...	—	—	—	—	—	9	9	9	3	2	5	3	—	3	—	—	—	—	—	—	2	—	45
3½ in...	—	—	—	—	—	1	8	17	8	1	5	2	1	—	—	—	—	1	—	—	—	—	44
4 in...	—	—	—	—	—	—	1	8	3	8	13	7	—	—	1	—	—	—	—	—	—	—	41
4½ in...	—	—	—	—	—	—	—	1	8	3	6	4	—	1	—	—	—	—	—	1	1	—	25
5 in...	—	—	—	—	—	—	—	—	2	7	11	8	3	—	1	1	—	—	—	—	—	1	34
5½ in...	—	—	—	—	—	—	—	—	—	4	2	6	5	1	—	1	—	1	—	—	—	—	20
6 in...	—	—	—	—	—	—	—	—	—	—	1	8	3	—	2	—	—	1	—	—	—	—	15

Plants from seed sown ½ in. to 3½ in. came into bloom on October 29th ; those from seed sown 4 in. to 5 in. deep on October 31st ; and those from seed sown 5½ in. and 6 in. deep on November 2nd.

All plants of this series ripened off in safety. Details concerning returns recorded are summarised further on in conjunction with those of 1909.

BARLEY IN HEAVY CLAY LOAM IN 1909.

Fifty grains of barley at the various depths were sown in 1909 on May 25th. Germination details are summarised below in Table XIX. :—

TABLE XIX.—*Showing Germination of Barley in Heavy Clay Loam in 1909.*

Depth of Sow- ing.	Germination Order and Numbers.																							Total.
	June.																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	July.	
1in...	5	12	14	7	7	2	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1	—	49
1in...	—	8	37	8	2	1	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	48
1½in...	—	8	21	10	4	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	46
2in...	—	—	11	26	8	3	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.
2½in...	—	—	1	9	20	9	2	2	1	—	—	—	—	—	—	1	—	—	—	—	—	—	—	45
3in...	—	—	—	2	9	7	2	6	—	4	2	1	3	—	—	—	1	—	—	—	—	1	—	38
3½in...	—	—	—	—	—	—	4	5	4	2	3	2	6	—	1	—	—	2	—	—	—	—	—	29
4in...	—	—	—	—	—	—	3	3	1	4	4	1	3	3	—	—	—	—	—	—	2	3	1	28
4½in...	—	—	—	—	—	—	—	3	3	—	1	1	6	1	—	—	—	2	—	—	—	—	—	17
5in...	—	—	—	—	—	—	—	1	—	2	3	—	1	5	1	—	—	1	—	—	1	—	—	15
5½in...	—	—	—	—	—	—	—	—	4	—	3	2	2	6	1	2	—	1	—	—	1	—	1	23
6in...	—	—	—	—	—	—	—	—	2	1	1	1	1	—	—	—	—	—	—	—	—	1	—	7

We have summarised below in Table XX. the harvest returns collected, both in 1908 and 1909, for barley sown at various depths in heavy clay loam.

TABLE XX.—*Showing Harvest Returns from Barley Sown at Various Depths in 1908 and 1909 (Heavy Clay Loam).*

...						Percentage of Germinated Plants Dying off.	Grain.		Total Produce.	
Depth of Sowing.	1908.		1909.		Total Matured.		Total.	Per Plant.	Total.	Per Plant.
	Germinated.	Matured.	Germinated.	Matured.						
1in. ...	50	50	49	45	95	4	106	1.12	216	2.27
1in. ...	49	49	48	43	92	5	113	1.23	232	2.52
1½in. ...	47	47	46	44	91	2	111	1.22	236	2.59
2in. ...	50	49	50	48	97	3	110	1.13	244	2.52
2½in. ...	45	43	45	42	85	6	91	1.07	188	2.21
3in. ...	45	41	38	35	76	8	76	1.00	176	2.32
3½in. ...	44	42	29	24	66	10	78	1.18	164	2.10
4in. ...	41	41	28	26	67	3	82	1.22	162	1.98
4½in. ...	25	24	17	16	40	5	63	1.58	120	1.90
5in. ...	34	34	15	13	47	4	53	1.13	112	2.11
5½in. ...	20	18	23	18	36	16	60	1.67	108	1.80
6in. ...	15	11	7	5	16	27	22	1.38	48	2.18

Table XX. shows the heaviest yields in heavy clay loam to have been realised from seed planted between 1 in. and 2 in. The seventh column of this table shows that the percentage of germinated plants that die off is somewhat irregular, although on the whole more pronounced at the greater depths.

SUMMARY OF THE GERMINATION OF BARLEY SOWN IN HEAVY CLAY LOAM OVER THE THREE SEASONS.

The general germination results, together with the average germination percentages for the three seasons of barley sown at various depths in heavy clay loam, have been summarised below in Table XXI. :—

TABLE XXI.—*Showing Summary of Germination of Barley at Various Depths in Heavy Clay Loam in 1906, 1908, and 1909, together with Average Germination Percentages.*

Depth of Seeding.	Numbers Germinated.				Average Germination Percentages.
	Out of 10.	Out of 50.	Out of 50.	Out of 110.	
	1906.	1908.	1909.	Total.	
½ in.	10	50	49	109	99
1 in.	10	49	48	107	97
1½ in.	9	47	46	102	93
2 in.	9	50	50	109	99
2½ in.	10	45	45	100	91
3 in.	6	45	38	89	81
3½ in.	8	44	29	81	74
4 in.	7	41	28	76	69
4½ in.	5	25	17	47	43
5 in.	5	34	15	54	49
5½ in.	4	20	23	47	43
6 in.	3	15	7	25	23

It will be noted that in heavy clay loam satisfactory germination of barley does not extend to as great depths as proved to be the case in land of a light sandy nature. Best germination appears to take place when seed has been sown between $\frac{1}{2}$ in. and 2 in. in depth.

There remains now to be shown the average periods extending between seeding and the time when the seedlings show above ground for the various depths tested. In this connection we found that in heavy clay loam—

Plants from seed sown	$\frac{1}{2}$ in.	deep showed above ground	8 to 15 days after
"	1 in.	"	9 to 13 "
"	$1\frac{1}{2}$ in.	"	10 to 16 "
"	2 in.	"	10 to 18 "
"	$2\frac{1}{2}$ in.	"	11 to 20 "
"	3 in.	"	12 to 25 "
"	$3\frac{1}{2}$ in.	"	14 to 25 "
"	4 in.	"	15 to 28 "
"	$4\frac{1}{2}$ in.	"	15 to 27 "
"	5 in.	"	15 to 28 "
"	$5\frac{1}{2}$ in.	"	17 to 27 "
"	6 in.	"	17 to 25 "

GENERAL CONCLUSIONS ON DEPTH OF SOWING FOR BARLEY.

From the tables and data supplied we derive the following conclusions :—

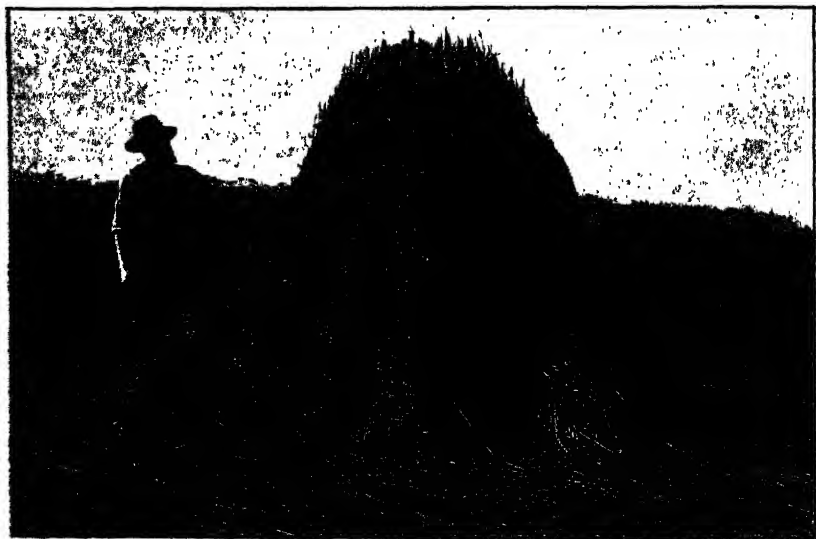
1. Barley can with perfect safety be sown at greater depths than wheat.
2. In light sandy land the most advantageous depth for sowing barley would appear to lie between $1\frac{1}{2}$ in. and $2\frac{1}{2}$ in.
3. In light sandy land the germination of barley is apparently quite satisfactory even at depths of 4 in., but the proportion of plants dying back at these depths appears to be greater than is the case with seed placed between $1\frac{1}{2}$ in. and $2\frac{1}{2}$ in. deep.
4. The data bearing on the yields of barley in light sandy land at the various depths are, perhaps, insufficient for safe generalisation; such as they are, however, they would appear to point to depths of $1\frac{1}{2}$ in. and $2\frac{1}{2}$ in. as giving the best results.
5. At the depths recommended for the sowing of barley in light sandy land germination of unpickled seed, with the land in good seeding condition, is generally completed within 9 to 17 days; at greater depths germination generally extends over a longer period, and is generally far more irregular.
6. In heavy clay loam germination appears to be normal between $\frac{1}{2}$ in. and $2\frac{1}{2}$ in.; slightly shallower seeding may, therefore, be recommended than for light sandy land, probably between 1 in. and $1\frac{1}{2}$ in.
7. In heavy clay loam depths of seeding below $2\frac{1}{2}$ in. are not to be recommended, as at greater depths germination is usually faulty, and the proportion

of plants dying back after germination is generally greater than at shallower depths.

8. In heavy clay loam the highest yields of grain and of total produce, both total from individual plants, appear to be secured from plants sown between 1in. and 2in. deep.

9. In heavy clay loam unpickled seed sown 1in. to 2in. deep shows above ground within 9 to 18 days of seeding ; at greater depths germination always extends over a longer period of time, and is apt to be very irregular.

(To be continued.)



THE AUSTRALASIAN FRUITGROWERS' CONFERENCE.

REVIEW OF PROCEEDINGS.

By GEO. QUINN, Horticultural Instructor.

The above Conference was held this year in Brisbane from October 3rd to 7th. Delegates from all parts of the States excepting West Australia attended. By special invitation each Department of Agriculture in the States (West Australia again' excepted) sent an official representative. In this capacity the writer was afforded an opportunity of attending the sittings of the Conference and participating in the excursions to orchards in various parts of southern Queensland, so kindly arranged by the Government of the northern State.

The Conferences are now looked upon as an annual fixture, and matters of a greater or lesser importance to the fruit-growing industry are discussed and resolutions passed upon the same. The delegates assembled at the Conferences assume to legislate, so to speak, or, rather, influence the tide of affairs legislatively for the whole of the fruit-growing industry in the Commonwealth, but it is claiming rather too much to say they represent the whole of that form of production. The delegates are elected by the different societies or associations affiliated with the body designating themselves the Australasian Fruitgrowers' Conference, but these associations numerically, in some States at any rate, represent but a very small proportion of the persons engaged in fruit-growing. For this the Conference is not to be blamed, and if their interests and desires are not efficiently served the growers who do not belong to the various associations have themselves alone to thank. In these days every class interested in any special line of business, profession, or trade failing to become imbued with the importance of collective action must suffer impositions and bear burdens which are preventable to a greater or lesser degree. There appears to be a tendency for the members of those associations in closest touch with the metropolitan areas and who busy themselves most in the affairs of such phases of the industry in which they are specially interested to come to the front and sway the policy of Conferences. It is open to question whether these particular interests are always concomitant with the furtherance of the broader concerns of the orchardists of the Commonwealth as a whole.

There is a possible danger of these meetings gradually drifting into an annual excursion, in which individual interests are being served under the guise of benefaction conferred upon the whole of those engaged in the important national industry.

A PERTINENT POINT.

The State Governments in turn vie with each other in showing courtesy to the assembled delegates, and doubtless thus aid materially in forming a federal spirit amongst persons in the various States who may have interests more or less in common. No harm can arise from such an action, but in countenancing the acceptance of favors from trading concerns, such as shipping companies, may not the persons these Conferences presume to represent be countenancing a shortsighted policy? If, as the annual grievances of these conferences indicate, the traders, and through them the fruitgrowers suffer so severely from the lack of facilities afforded by these sea carriers, it is open to question whether these disabilities are likely to receive proper redress under the present procedure. It is seldom the half-starved watch-dog can withstand the temptation of a seductive morsel of his favorite food. Whilst the Australasian Fruitgrowers' Conference continues to accept small favors in the shape of free passes from shipping companies the fruitgrowers of Australasia as a whole, if possessed of genuine grievances against these companies, can scarcely hope for a vigorous prosecution of the campaign—having for its object the mitigation of those disabilities—from the recipients of such favors.

A MARKED CHANGE.

When the Fruitgrowers' Conferences were initiated about 1894, and subsequently held at Mildura, Hobart, Wellington, and Brisbane respectively, the subjects upon which papers were contributed and discussions took place were comprehensive and educative in character. In printed form these comprise probably the most valuable contributions to the literature upon fruit culture in Australasia we now possess. The Conferences of the past decade in cold print represent very largely a series of complaints—possibly imaginary as well as real—against shipping companies, State railways, or regulations made by various States to control the trade in plant products. These changes are radical, and possibly may be read as true "signs of the times," indicating that the fruit industry of Australasia has entered upon another phase, which seems to have for its aim a better distribution of the results of the orchardist's labor, rather than merely increasing his efficiency as a producer. Nor can it be denied this is a laudable project. Too long the orchardist has relied upon others to find him relief, and now he will perforce follow the truism which advises one who desires a thing done well to do it himself.

It is to be believed that the actions of these Conferences will—whether accurate or in error—make for a more widespread interest being developed among fruitgrowers in the matters which vitally concern them, and which they alone who understand all the difficulties should properly handle.

AN EDUCATIVE ADDRESS.

The sittings of the Conference were opened by His Excellency the Governor of Queensland (Sir William MacGregor), who adopted the somewhat novel course of reading a most carefully compiled paper upon matters of intimate concern to fruitgrowers and the public generally. The main points touched upon in this paper had relation to the use of fruit for food, and the need for research into the pests and diseases which prey upon the crops of the orchardist. In these connections His Excellency spoke from the standing of a highly trained scientist, and in the latter he most certainly touched upon the weakest link in the operations of the various State Departments of Agriculture in Australasia when he condemned a system which expected officers to carry on administrative duties at the same time as laboratory research work.

In this connection Sir William said—"We require separate and different officers for research and executive duties. I earnestly urge on this Conference the careful consideration of the question whether the time has not come when Australia should possess an up-to-date Bureau of research in economic entomology and mycology." The Conference decided that the paper be printed, and then quickly subsided into discussions upon less abstruse matters, such as the desirability of "abolishing duties on wrapping paper," and "the removal of fees charged for inspecting fruit."

DUTY ON BANANAS.

Side by side with these demands crept in requests for increased duties upon citrus fruits and bananas. In support of these one member contributed a lengthy paper describing in soul-racking terms the horrible conditions of the Coolie laborers where these fruits were being produced in Fiji. He did not, however, give any information of the conditions under which the Mongol laborer produces bananas in Queensland; neither did those who discussed the motion in a "full knowledge of local matters" display much desire to uphold the "white Australia" policy by asking for an increase of 200 per cent. of duty on white grown bananas only. The fact remains that the Queensland grower of bananas has not been able for some years to supply the southern markets with bananas of a quality equal to that of former years, and the Fijian product of a superior character has crept in. Competent authorities claim that equally good bananas can be produced in Queensland, but the facilities for placing them upon the markets of the southern States of Australia are not forthcoming. It might be pertinently asked "Have not the shipping companies by their unsympathetic methods killed the goose which laid the golden egg?"

THE SUGAR DUTY.

A note indicating conflicting interests between north and south was brought into the discussions by the introduction of the question of the removal of

duty upon sugar used in the manufacturing of fruit products. The claims of the commercial canner of fruits and maker of jams to special treatment received much support, but the sugar requirements of the jam-maker who is found in nearly every kitchen of the Commonwealth appeared to be very much overlooked.

FRUIT CASES.

The question of cases in which to sell fruit is of perennial interest to fruit-growers. Two motions in relation to this figured largely in the deliberations of the Conference. In the first place, the delegates discussed the advisableness of having a standard fruit case which should be legalised in every State. This motion was aptly described by a delegate as "a hardy annual" revived and resolved upon at every Conference for years past. This year's meeting disclosed the same divergence of opinion and vagueness of requirements as those of previous years. The official visitors had, in most instances, come charged to obtain a knowledge of what the growers really did want, or could agree they needed, and intimated that this knowledge must be forthcoming to guide fruit case legislation now pending in their States. A long discussion resulted in an agreement which claimed to achieve uniformity by yielding to diversity. The following are the dimensions of the cases recommended:—

(1) The Australian bushel case, inside measurements 18in. x 14½in. x 8½in., cubic capacity 2,223in., recommended for the apple trade.

(2) Australian half-bushel case, 18in. x 11½in. x 5½in., capacity 1,110 cub. in.; Australian half-bushel case, 18in. x 8½in. x 7½in., capacity 1,111½ cub. in. Both recommended for use in packing pears, plums, gooseberries, &c.

(3) Australian flat bushel case, 26in. x 14½in. x 6in. = 2,223 cub. in. (without reckoning the division which must be provided for in increased length). Australian flat half-bushel case, 26½in. x 7½in. x 6in., cubic capacity 1,111½in., without counting the division. The flat bushel case was commended as suitable for packing pears, oranges, and lemons, and the flat half-bushel for tomatoes, apricots, peaches, &c.

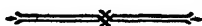
(4) Australian quarter-bushel case, 13½in. x 10½in. x 4in., cubic capacity 556½in. Claimed to be suitable for packing choice cherries, gooseberries, &c.

(5) The Australian tropical case, 24½in. x 12in. x 12in. = without the division 3,564 cub. in. Used for bananas and pineapples in southern Queensland and recommended for use in over-sea export of oranges, as it is the same case which is in vogue in the United States of America for this purpose. When used for oranges a division must be allowed for in an increased length.

These represent three large cases and four small ones, seven in all, and it was claimed by the Conference that apart from trays, punnets, &c., these would meet every requirement for the Australian fruit trade as at present understood. If out of this comes reasonable uniformity in the fruit case

question throughout the Commonwealth the 1911 Conference will not have been held in vain.

The second question respecting fruit cases showed that fruitgrowers and dealers have profited by past experience and display a desire to assist the authorities in the various States in their efforts to restrict the distribution of fruit and plant pests. It took the form of a request to be allowed to use secondhand cases in inter-State trade, providing they were effectively sterilised. It was pointed out that timber for fruit cases was a diminishing quantity, slowly but surely increasing in value, and at present much good case timber is wasted. This statement carries more weight in the trade between the eastern capitals than in this State, where, owing to the natural scarcity of suitable case woods, the imported case is utilised in the internal trade in fruit to its full period of durability. The officials present discussed the question fully at the request of the Conference and recommended the use of boiling water for the purpose of disinfecting the boxes, as, although the wood may be darkened after scalding, the process would prove hygienically valuable from the consumer's point of view, as well as be a more general destroyer of plant pests than any form of fumigation.



EXTRACTS FROM TRADE COMMISSIONER'S REPORT.

FROZEN MUTTON AND LAMB.

I am told that at the present time (September 29th) Bristol is buying frozen mutton in London and paying the extra 1½d. per stone for freight. There seems to be a demand in Bristol for frozen meat, and I repeat what has so often been said: that shippers will be well advised to seriously consider the advisability of sending consignments in larger quantities to Bristol and other outports.

Owing to the high prices of all food on the Continent and the general scarcity of meat, it seems probable that in the near future the restrictions placed upon imports of frozen meat by Germany and Austria may be relaxed. I understand that cold stores are about to be built in Greece, and that the importation of frozen meat is to be undertaken.

FLOUR.

I have a letter from a prominent firm of flour importers, and as it may interest millers I quote from it as follows:—

“We understand the Australian millers intend putting their flour on the English market under particular brands and to bring them before the bakers and the public.

"We should be considerably obliged if you could have sent to us 7-lb. samples of two grades of flour, patents and bakers'.

"We hear your millers claim that they can send a flour that needs no blending; we have handled large quantities of Australian flour in the past and have always found it too weak by itself, color and flavor good, strength poor. We are open for business if we can find suitable flour."

MEAT FOR AUSTRIA, GERMANY, AND FRANCE.

Since writing on this subject as above I have received a letter from our Hamburg clients on the question of the importation of meat into Germany, in which they say—

"*German Meat Import Question.*—With reference to the extensive correspondence we have had on this subject with your predecessor, we are sorry that we have not heard anything further from your office for a long time. Nevertheless we think that it will be interesting for you to know that the general elections in Germany have been definitely fixed to take place in January next. The Socialist party has already entered the contest, and as we repeatedly wrote you a long time ago, our anticipations will be realised and the principal question in the contest will be the dear food question. The propaganda will be chiefly in the direction of trying to induce the Government to facilitate the import of meat. The Liberal parties will make this propaganda also, and, as we expected, they will assist the Socialist party in the elections and *vice versa*. The propaganda will be much assisted this year owing to the high prices ruling for all foodstuffs, consequent on the drought in Europe which has prevailed this summer. It, of course, is an open question whether the Liberal-Socialist parties will succeed, but anyhow, the associated committees of the various town councils are already again submitting to the Central Government a petition with regard to the advisability of permitting the import of foreign cattle, and also foreign meat from the Argentine. The discussions in the newspapers about the frozen meat question go only into the question of importing Argentine meat, and if ever all these endeavours should prove successful we are afraid that only Argentina will profit, as no propaganda whatever and no publications are ever made in favor of Australian meat and other Australian food products being imported. As far as we have been informed by your predecessor the Australian Commonwealth Government has been studying our proposals, and we have thought it worth while to-day to revert to the subject, and to leave it to your judgment as to whether it would be worth while to again refer to the matter with your Government, i.e., if they consider it of interest."

From the statements in the press there appears to be a strong and growing feeling in France also for the admission of frozen meat.

PORK.

The market prices to-day are Dutch, 3s. 6d. to 4s.; English, 3s. 8d. to 4s. 4d. per stone.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started on April 1st, 1911, and to terminate March 31st, 1912.]

Competitor.	Eggs Laid for Month ended October 31st.	Total Eggs Laid from April 1st, 1911, to Oct. 31st, 1911.
SECTION I.—LIGHT BREEDS.		
WHITE LEGHORNS (except where otherwise noted).		
The Range Poultry and Egg Farm, Toowoomba, Queensland ..	137	673
Cosh, A. J., Normanville	147	701
Cowan Bros., Burwood, N.S.W.	131	692
Hamill, H., Kogarah Bay, Sydney	133	621
Rhodes, H. G., Brompton	135	454
Collings, C. A., Riverton	144	646
Hay, C., Normanville	141	740
Stevenson H., Port Melbourne, Victoria	129	508
Pope, F., jun., Rockleigh	124	460
Malthouse, James, Normanville	146	651
Moritz Bros., Kalangadoo	135	695
Whetstone & Knappstein, Clare	143	518
Lampe, Bert, Kadina, S.A.	125	540
Collings, C. A., Riverton	143	704
Bertelsmeier, C. B., Clare	135	702
Bond, A. J., Clare	131	513
Moritz Bros., Kalangadoo	117	596
Waite, F. J. Osborne, Nailsworth	114	552
Ellery, J., & Son, Clare	132	646
Kempster, T. E., Lilydale, Victoria	115	496
Kinnear, Mrs. A. E., Hyde Park	132	548
Steer, W. J., Port Pirie West	115	479
Fitz-Gerald, Gerald, Mordialloc, Victoria	127	578
Featherstone, Mrs. M. A., North Croydon	141	469
Lawson, Miss N., Lower Mitcham	143	556
Provis, Mrs. W., Eudunda	139	563
Stead, J. F. T., Woodville	139	632
Uren, Mrs. P. A., Kapunda	150	670
Codling H., Mitcham Park	132	549
Provis, W., Eudunda	122	583
Pedder, E. A., Burnside	130	592
Tockington Park Poultry Farm, Grange	113	603
Swann, V. Roy, Jamestown	112	386
Miels, C. & H., Littlehampton	129	489
Wondatta Poultry Farm, Eudunda	115	323
Purvis, Master James, West Glanville	122	611
South Yan Yean Poultry Farm, South Yan Yean, Victoria	120	519
Sargenfri Poultry Yards, East Payneham	126	613
Mazey, Phillip, Alberton	133	582
Padman, A. H., Hyde Park	135	661
Hill Chas., Monarto South	119	496
Read, J. D., Springhurst, Victoria	125	522
Mildren, D., Clare	125	599
Eckermann, W. P., Eudunda	123	445
Hurford, E. W., Grangeville	124	679
Sargenfri Poultry Yards, East Payneham	124	575

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended October 31st.	Total Eggs Laid from April 1st, 1911, to Oct. 31st, 1911.
SECTION I.—LIGHT BREEDS—Continued.		
WHITE LEGHORNS (except where otherwise noted).		
Shepherd, R. H., Balaklava	126	573
Rice, J. E., Cottonville	120	575
Burden, H. F., Balaklava	120	591
South Yan Yean Poultry Farm, South Yan Yean, Victoria....	147	584
Keddie, B. A., Woodside	143	578
Purvis, Miss Gracie, West Glanville	133.	673
March, H. S., Kapunda	137	608
Mildren, D., Clare	143	567
Hill, Chas., Monarto South	112	604
Marshall, J. W., Moonta	125	607
Hollands, Iru, Moonta	131	595
Dyer, P., Woodville	126	506
Edgar, R., Moonta	135	644
Hocking, E. D., Kadina	130	441
Purvis, W., West Glanville	130	713
Carling, R., Kangaroo Flat	142	600
Howlett, H., Moonta	142	541
Addison, Mrs. A. L., Malvern	131	505
Menkens, F. H., Henley Beach	133	638
Haimes, T. F., Fullarton Estate	131	547
James, Wm., Croydon	124	456
Pettigrove, T. A., Northcote, Victoria	123	555
Read, J. D., Springhurst, Victoria	100	419
Riordan, D., Kent Town	120	492
Kappler Bros., Marion	134	541
Bertelsmeier, C. B., Clare	131	602
"Koonoowarra," Enfield	127	552
Marrison & Smith, Prospect	125	543
Connor, D. C., Gawler	139	614
Thistle Stud Poultry Farm, Quorn	141	510
Uren, P. A., Kapunda	142	523
March, H. S., Kapunda	126	624
Navan Poultry Farm, Minlaton	129	425
Holmes, F. A., Frances	108	539
Lillywhite, E. G., Dulwich	109	631
Burden, Mrs. M., Islington	102	547
Coombes, E. R., Silverton, N.S.W.	119	638
Curtis, G. R., Mitcham	117	532
Roche, Mrs. N., Middle Brighton, Victoria	103	420
Mitcheson, E. H., Prospect	113	655
Hannaford, F. E., Monteith	120	551
Belcher, P. A. S., Georgetown	112	467
Whitrow, A. J., Knoxville	117	566
"Eurima," Kybybolite	117	430
Kalms, A. G., Eudunda	114	514
Counter, E., & Foreman, Hindmarsh	108	446
Morton, T. W., East Moonta	103	434
Hall, T. G., Rose Park	105	480
Ontario Poultry Farm, Clarendon	131	488
Biggs, W. D., Hyde Park	127	564
Tomlinson, W., Clarence Park	127	467
Redfern Poultry Farm, Caulfield, Victoria	150	812
Sickert, P., Clarence Park	141	736
Bennett, W. C., Magill	140	631
Franklin, G., Kent Town (Minorcas)	122	566

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended October 31st.	Total Eggs Laid from April 1st, 1911, to Oct. 31st, 1911.
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SECTION II.—HEAVY BREEDS.

BLACK ORPINGTON.

Brundett, S., Moonee Ponds, Victoria.....	125	568
Phillips, A., Portland, S.A.	129	536
Cowan Bros., Burwood, N.S.W.	116	587
Hutton, C., Parkside	120	405
Bertelsmeier, C. B., Clare	119	394
Tockington Park Poultry Farm, Grange.....	103	524
Padman, J. E., Plympton	96	572
Killara Poultry Farm, Tyatt, Victoria	118	477
Martin, B. P., Unley Park	113	642
Francis Bros., Fullarton.....	110	577
Bertelsmeier, C. J., Clare	113	500
Padman, J. E., Plympton	98	604
Killara Poultry Farm, Tyatt, Victoria	135	593
McKenzie, E., Northcote, Victoria	124	683
Craig Bros., Hackney	103	721

BUFF ORPINGTON.

Ross, J. W., Somerton, <i>via</i> Glenelg.....	95	496
Hocart, F. W., Clarence Park	99	468

WHITE ORPINGTON.

Sykes & Harvey, Hamley Bridge.....	87	453
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SILVER WYANDOTTES.

Cant, E. V., Richmond	96	631
Kappler Bros., Marion	88	537
Burden, H. P., Balaklava	121	480
Redfern Poultry Farm, Caulfield, Victoria	115	410

LANGSHANS.

Stevens, E. F., Littlehampton	110	540
Jonas, H. D., Broken Hill	95	426
Toseland, Geo., Geranium	109	584

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended. October 31st.	Total Eggs Laid from April 1st, 1911, to Oct. 31st, 1911.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS (except where otherwise stated).

Moritz Bros., Kalangadoo	143	815
Sudholz, Alf., Kalangadoo	121	563
Boyce, J., Kalangadoo	122	570
"Mahama," Mount Gambier	136	713
"Herdsfield," Mount Gambier	136	656
Lewis, C., Bordertown	104	504
Staunton, S., Naracoorte	115	407
Lillywhite, B. G., Dulwich	109	628
Jarrad, J., Mount Gambier	113	655
Hall, C. W., Mount Gambier	124	645
Sargenfri Poultry Yards, East Payneham	139	604
Vorwerk, H. F. & A. C., Millicent	139	697
Lacey, F. C., Kybybolite	138	626
Cinnear, Mrs. A. E., Hyde Park	134	595
Rake, A., Kalangadoo	138	578
"Eurinima," Kybybolite	113	508
Smith, R. L., Hynam	112	464
Day, Mrs., Roseworthy	116	494
Scholz, C. H., Kybybolite	133	584
Purvis, W., West Glanville	134	619
Hannaford, Mrs. F. E., Monteith	128	617
Jenkins, Mrs. C. J. A., Kybybolite	120	573
Bertelsmeier, C. B., Clare	150	582
Javan Poultry Farm, Minlaton	125	467
Scholz, A. R., Kybybolite	122	528
Mohr, S., Tantanoola	138	605
Featherstone, Mrs. M. A., North Croydon	115	458
Tosland, G., Geranium	121	533
"Koonocwarra," Enfield	115	466
Palmer, W., Franklin Street, Adelaide	112	461
Cosh, A. J., Normanville	114	588
Queale, W., Lamerloo	131	575
Tomlinson, W., Clarence Park	114	425
Reed, A. J., Pinnaroo	147	466

SECTION II.—HEAVY BREEDS.

SILVER WYANDOTTES.

McNamara, Mrs. D., Mount Gambier	44	523
Moritz Bros., Kalangadoo	69	433
Staunton, S., Naracoorte	108	454
Burden, H. P., Balaklava	38	514
Vorwerk, H. F. & A. C., Millicent	49	513
Virgo, A. W., Bordertown	58	354

BLACK ORPINGTON.

Smith, W., Hynam	106	321
Phillips, A., Portland, S.A.	104	440
McNamara, Mrs. D., Mount Gambier	87	420
Bertelsmeier, C. B., Clare	79	375
Blue Lake Poultry Yards, Mount Gambier	69	554
Bail, H., Kaniva, Victoria	58	424

LANGSHANS.

Tosland, Geo., Geranium	71	520
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NOTES ON EGG-LAYING COMPETITIONS.

Department of Agriculture, Victoria Square, Adelaide.

The Superintendents report as follows:—

ROSEWORTHY.

Number of pens, 128; number of hens, 768. The health of birds has been good during the month. Two deaths were reported; both were White Leghorns. The egg return has been fair only; the highest weekly average per pen was 29.7 only. The laying does not promise any improvement. The leading pen has proved consistent in the matter of weekly records, which are satisfactory. The weather has been mild; the average minimum temperature was 44.22 and the average maximum 74.30. Rain fell on three days; total, 23 points. There was more or less wind on 24 days. No less than 38 hens from 20 pens of White Leghorns have been temporarily withdrawn for broodiness. One cannot expect good scores when our breeders are so lax in their methods. Among the heavy breeds there were 84 broody hens. A large number of persons visited the poultry station and inspected the competition birds, &c., and more would do so but for the four miles intervening between railway station and College grounds.

KYBYBOLITE.

Number of pens, 47; number of hens, 282. Scratching shed houses 8ft. x 4ft. 6in. in which the birds were confined until end of September. The general health has been good; only one death occurred. The laying for the month has been fairly consistent among the pens comprising section 1. The leading pen eased off early in the month, but has made up since. During the early part of October the weather was fine and clear; later it became dull and cloudy, with cold nights. Minimum temperature 31°, maximum 78°. Among the heavy breeds, section 2, the number of broody hens was great, and often included every bird in the pen; a few Leghorns in section 1 were also broody. A good number of people have visited the station, which is a popular institution in the South-East.
D. F. LAURIE, Government Poultry Expert.

POULTRY NOTES.

By D. F. LAURIE, Poultry Expert.

OPERATIONS FOR NOVEMBER.

PREVENTIVE MEASURES AGAINST DISEASES.

Sunshades.—The days are becoming longer and warmer, and at times, especially in the North, the sun gives forth great heat. Shelter from the fierce rays of the sun should be provided in all poultry yards. It often happens, especially in suburban back yards, that the fowls have no shelter from the sun other than a somewhat popular style of iron poultry-house which is, in structure, an enlarged Dutch oven. Suitable and cheap shelters can be made of a variety of materials; Galvanized-iron well coated with

thick whitewash makes a lasting shade, and if properly constructed is quite cool. Sacking whitewashed on both sides makes an excellent and cool shade. These, either the iron or the sacking, should be erected upon a light framework, sloping so that the back portion is close to the ground and the front portion, facing south, about 18in. high. This shade, if about 4ft. square, will accommodate eight or 10 fowls, and here also the drinking vessel may be kept well shaded. In very hot weather the earth under these shades should be well soaked with water early in the morning. The cool earth will be much appreciated by the gasping birds during a heat wave.

Drinking Vessels.—Different people have their own ideas as to what is a suitable drinking vessel for poultry. Cheapness is a persistent cry, and yet few poultry-owners are so poor that they could not afford the sanitary glazed earthenware pans, which can be purchased for a few pence. Old kerosine tins, fish tins, and even broken bottles are much in evidence, and, owing to the difficulty in cleansing them, serve as an excellent harbor for disease organisms. Bearing in mind the undoubted fact that much disease is spread through the medium of the drinking water, breeders should pay scrupulous attention to cleanliness. This can best be effected by adopting easily cleaned pans, and in addition by cleaning and disinfecting them at frequent intervals. There is no disinfectant or germicide that can safely be added to the drinking water of poultry, and which is sufficiently powerful to destroy disease organisms without harmful effects upon the fowls. There are certain chemicals, such as sulphate of iron, sulphate of copper, permanganate of potassium, and permanganate of soda, which have an inhibiting effect on the germs for the time only. Stock solutions of these may be kept on hand and added to the drinking water. The iron sulphate (FeSO_4) mixture with sulphuric acid (H_2SO_4), commonly known as Douglas's mixture, may be used, but if too strong may act prejudicially. Potassium permanganate ($\text{K}_2\text{Mn}_2\text{O}_8$) is erroneously termed Condry's crystals. This chemical in solution acts as a mild antiseptic, is cheap, and, if not used too strong, harmless—should not be mixed with glycerine, animal oil, &c. Make a stock solution, and add just enough to give a pinkish color to the water. It soon loses its oxygen, which is the disinfecting agent. Sodium permanganate ($\text{Na}_2\text{Mn}_2\text{O}_8$) is the salt used in Condry's red fluid. It is a good and cheap disinfectant, but is not more powerful than the potassium compound. Copper sulphate (CuSO_4) is poisonous, and is only for use in urgent cases where there is a serious outbreak. I advise its use for sterilising the water vessels, for which purpose it is admirable, rather than for adding to the drinking water. The water vessels should be scrubbed clean and then rinsed for a few minutes in a strong (2ozs. to the gallon) solution of the copper sulphate (ordinary bluestone).

Disinfecting Yards and Houses.—The foregoing preventive measures, if thoroughly carried out, will ward off most diseases. However, where

fowls are yarded in small enclosures the soil must be regularly attended to, or it may become saturated with droppings, and so constitute a breeding ground for disease organisms. In the life cycle of many disease organisms we know that they pass and repass through poultry. Under certain conditions they may pass through without causing trouble, and be voided and remain in the soil and perhaps undergo metamorphosis. Later on they contaminate some of the food and are again ingested, with the probable result of a serious outbreak of disease. Without going into lengthy details, this feature, about which I wrote many years ago, has been submitted to lengthy tests and undoubted proof in respect to the dreaded blackhead disease of the turkey in America. To those who argue that fowls should not be yarded in small enclosures, but should have liberty, I again say that the conditions are only relative. It is a matter of time only before a neglected 80-acre paddock becomes unfit for poultry. A small enclosure can be made to serve all the wants of poultry as regards exercise and freedom. It has the advantage that its small area permits one to effectively sterilise the soil and so destroy all disease organisms. The fact is that people will not take the trouble to do this properly. The yard should be swept clean and the refuse burned. The soil should then be stirred to a depth of a couple of inches. Then a 5 per cent. solution of any of the commercial germicides should be applied with a watering can with a coarse rose until the soil is saturated. Keep the fowls away for 24 hours, and before they are readmitted to the run it should be forked over and well littered with several inches of straw. The house should be similarly treated, and the sides, roof, and every part sprayed thoroughly with the same germicide.

A Warning.—I am impelled to write the foregoing and to urge very careful consideration. I am much disturbed by the appearance in this State of a disease among the chickens which is causing much mortality. It is commonly known as "white diarrhoea," and the same organism in another stage causes the dread disease among turkeys, also known as hepatitis, or blackhead. The specific organism is *coccidium avium v. tenellum*. There is, unfortunately, no doubt about the matter, as I have several times made microscopic examinations which agree completely with the American investigations. Apart from this disease, very heavy losses occur yearly through other diseases which can be prevented almost completely. All over the world those who are scientifically investigating such troubles are agreed on the point that systematic sanitary measures are the only safe and sure ones to adopt. F

The Growing Stock.—Keep the yards, coops, and brooders scrupulously clean. Scrub and disinfectant regularly. Foul, evil-smelling brooders cause a lot of trouble. One need not smell this trouble like an African witch doctor. The accumulations of filth can be seen without a microscope. Do not overcrowd; give the young stock room enough for a fair amount of exercise; provide plenty of litter for scratching. Erect shade under which they can

rest during the heat. Never let the drinking vessels remain dry; the over-thirsty chicken or duckling will drink until it is ill and then there are losses. Give plenty of fresh cut greenfood; most of our poultry-breeders are afraid to feed greenstuff. If you watch fowls and ducks at liberty where there is plenty of growth they will be seen eating greenfood nearly all day. Therefore, why be niggardly with this cheap and natural food?

Cull Vigorously.—Cull out all weeds or wasters; they will not repay the food and trouble of rearing. The room they occupy is valuable, and you can give more attention to the good ones remaining. Do not aim at numbers regardless of quality; be content rather with fewer birds, but let them be good, and give them every necessary attention.

Pullets as Layers.—Pullets should be run in flocks and carefully graded to size. The older pullets bully the small ones, which fail to progress. Do not force them; feed well on a sufficiency of nutritious food, and be not over-anxious for them to begin laying. Any wasters or poor doers should be culled out and fattened for the table; they will not make layers.

Cockerels.—Select your best and put aside for sale, or use as stock birds. Put an old tough cock with them to keep order and stop fighting. The balance should, as soon as they reach a decent size, be penned up, and all fattened and sent to the Produce Department for sale.

Good Prices for Table Poultry.—Good cockerels are realising excellent prices, and the demand will continue until Christmas at least. Not less than 3lbs. live weight is what the trade prefers—there is not much demand for small chickens. Care should be taken in forwarding the poultry in proper crates—very often the packages in which fowls are forwarded are an absolute disgrace. Ducklings are scarce, and those of good size will command good prices.

Eggs.—As no suitable space could be obtained in any of the outward bound steamers, no shipments of eggs in the shell could be made to England. It is stated by those in the trade that there is an excellent demand for our eggs in the other States. Just so; but at what price—as low as those who fix the market price like to offer. The market price in Adelaide is now 7½d., and will probably fall to 7d., and perhaps 6½d., as was the case last season when no shipments were made. As I stated in my address at the September Congress, the co-operation of poultry-breeders and farmers in this matter is the only solution. It seems incredible that our poultry-breeders will allow others to fix the price of their eggs. Space was offered for a big shipment, but, in the absence of any co-operation on the part of our producers, the attempt would not be made. The removal of 100,000doz. would have meant a better average price for all our eggs. Speculators would have been compelled to pay a fair price.

DISEASES OF FARM ANIMALS.

BY OFFICERS OF THE STOCK DEPARTMENT.

No. 3.—Digestive Disorders of the Horse.

(Continued from page 239, October issue.)

ENTERITIS (INFLAMMATION OF BOWELS).

This is a very fatal complaint amongst horses. The inflammation may be limited to one or more portions of the intestines, or it may affect all of them. In some cases the horse dies in a few hours; in others he lingers for 24 hours or longer. Violent exertion, chills, drinking cold water when hot, and the ingestion of mouldy food are given as causes of enteritis. It may be a sequel to colic, constipation, superpurgation (following the administration of purgative medicines), calculi, twist of the bowel, &c. It may also supervene in some fevers and constitutional troubles, *e.g.*, influenza.

Symptoms.—These depend largely upon cause. As a rule the symptoms are very like colic—the horse goes down and rises quickly; he turns round and looks at his flanks; as pain increases in intensity he kicks and struggles, the face becomes haggard, and he may sit on his haunches like a dog. The temperature is high, and pulse and breathing become rapid. The horse wanders about and a cold perspiration sets in. Just before death he may appear better, the pain having apparently abated; but the cold perspiration, haggard look, and thready pulse are all indications that he can hold out no longer, and death results.

Treatment.—Medicines should be administered to relieve the pain; opium in the form of laudanum may be given in $1\frac{1}{2}$ oz. doses diluted in a pint of water and repeated every two or three hours, and chloral hydrate and *Cannabis indica* in medicinal doses repeated every two or three hours are also useful in relieving the pain. Hot fomentations to the abdomen, if carefully applied, are also beneficial. If the acute symptoms subside the bowels should be relieved by laxative diet consisting of linseed tea, bran and linseed mash, and oatmeal gruel. No chaff should be given until all danger is past.

PERITONITIS.

Peritonitis (inflammation of covering of the bowels and other organs of the abdomen) is not a very common disease, except when associated with enteritis. It can, however, be produced through injuries to the abdomen, punctured wounds, or kicks, and it may follow the operation of castration.

Symptoms.—The symptoms simulate those of colic—pawing with the fore feet and striking the belly with the hind ones; the belly is tender on pressure. The temperature is high and pulse small and wiry. If this trouble follows the operation of castration there is generally stiffness and soreness of gait and swelling in the sheath and scrotum.

Treatment.—Treatment may be local and general. In cases of injuries or castration wounds attend to antiseptic treatment, give salines to allay fever, and if the pain is severe treat as for enteritis.

CONSTIPATION.

A torpid action of the bowels may be due to functional inactivity in the wall of the intestines, and horses habitually constipated have probably such a condition. As a rule, however, it is due to obstruction—the result of feeding on too much dry feed. When a horse is properly fed he is never affected with constipation.

Symptoms.—Symptoms consist of fulness of the belly; the dung is passed with difficulty, and there may be straining and evidence of pain. If these symptoms are unobserved and no treatment adopted the animal shows distinct evidence of sickness; the pulse is feeble, the appetite becomes impaired, and the horse staggers from weakness.

Treatment.—Treatment in cases of mild constipation consists in careful dieting, feeding on laxative food such as bran and linseed. If a horse is habitually constipated he should receive a purgative physic ball and afterwards undergo a course of tonics in his feed, *e.g.*, nux vomica, ginger, and gentian powders. In cases of obstinate constipation after administration of a purgative the horse should get copious drinks of linseed tea, and enemas of soap and water should be given by rectum three or four times daily. Constipation in young foals can generally be corrected by giving an enema of soap and water or olive oil. If there is no relief the foal should be drenched with 2ozs. of pure castor oil.

DIARRHOEA.

This may be defined as a frequent discharge of liquid manure. In some instances it is a symptom of a disease, as observed in the diarrhoea accompanying fevers and in diseased conditions of the liver and other organs. As a rule, however, it is caused through the direct influence of irritating materials on the membrane of the bowel itself, such as undigested food or rough food,

parasites, or bad water. A percentage of horses seem predisposed to diarrhoea; their bowels are continually in a relaxed condition. The nervous, badly-ribbed animal with the weak loins has generally a conformation predisposed to this complaint. The chief cause of diarrhoea is without question irregular dieting, and the practice of allowing horses to drink freely after feeding is very injurious.

Treatment.—In the treatment of diarrhoea it is very essential to ascertain the cause, and if the feeding and watering are faulty these should be rectified. If due to the presence of irritating, undigested food in the intestines administer a mild laxative, *e.g.*, a dose of raw linseed oil. If the diarrhoea continues after 24 hours administer the following:—Chlorodyne, 1oz.; chalk mixture, 3ozs.; flour gruel, 1qt.; and repeat if necessary every four hours. Cease using the astringent medicine as soon as the diarrhoea stops. If the animal is very weak give stimulants—whisky or brandy, three wineglassfuls in a pint of flour gruel three times daily.

Prevent the recurrence of this ailment by careful and judicious attention to feeding, watering, and stabling of the horses.

For foals give a dose of castor oil with a few drops of laudanum, and if diarrhoea continues give well-boiled starch gruel with a few drops of laudanum three or four times daily. A specific form of diarrhoea in foals will be dealt with in a subsequent article.

DISEASES OF LIVER.

Although diseases of the liver are very common in human beings diseases of this organ are very rare in horses. The absence of the gall bladder may help to prevent disease of the liver in these animals. Symptoms of liver affections are dealt with in connection with other ailments, and the chief drugs used are mercurial preparations, *e.g.*, calomel and vegetable tonics and bitters.

(To be continued.)



THE CURCULIO BEETLE.

RESULTS OF PREVENTIVE EXPERIMENTS.

By GEORGE QUINN, Horticultural Instructor, &c.

Owing to the injuries sustained from the attacks of the curculio beetle (*Otiorrhynchus cribricollis*) by the trees in the orchards at Coonawarra, in the South-East, during the past few seasons, the Inspector of Orchards in the South-Eastern districts (Mr. R. Fowler) was deputed to carry out a number of tests, with a view to determining a remedy, if possible, for this pest. As previously described in an illustrated article published in the *Journal of Agriculture*, this curculio beetle is capable of inflicting very great harm upon fruit trees. At that time its depredations had been mostly confined to small trees and the lower branches of larger ones. At Coonawarra, however, the pest has defoliated almost absolutely fully grown apple trees in bearing, and, what is worse, has taken to eating the bark off the fruit spurs and gnawing out the buds or biting through the stalks of the nearly full-grown apples. This injury has been sustained over several consecutive seasons, and, as Inspector Fowler reports, threatens ruin to some of the orchards if not checked. The remedies tested here—with the exception of the spraying with lead arsenate—were devised or adopted by Mr. Fowler on his own initiative, being suggested mainly by his local knowledge of the habits of the insect.

Mr. Fowler's report is as follows:—

"*Experiment No. 1—Spraying.*—In this experiment I used two brands of arsenate of lead—Nicholls' and Blythe's. Taking four rows of trees that were badly attacked by the beetles, around the stems of which numerous beetles could be found, I sprayed with the following strengths:—First row, 2lbs. arsenate to 4galls. water; second row, 2lbs. arsenate to 8galls. water; third row, 2lbs. arsenate to 12galls. water; fourth row, 2lbs. arsenate to 16galls. water. The first row suffered a little from scorching, the mixture being, of course, too strong. I only applied this to a few trees, more with the object of testing whether any strength of spray would poison the beetles. I took note of the sprayed trees from time to time and searched carefully through the soil round them, but could find no conclusive proof that the spraying had been of any use.

"In the second experiment I used Blythe's Blue Bell arsenate—2lbs. to 12galls. water, 2lbs. to 16galls. water, 2lbs. to 20galls. water, 2lbs. to 24galls. water. This spraying was done late in the season—January-February—and, though these experiments appeared to result in failure, I must confess it is rather hard to arrive at very satisfactory conclusions. I carefully watched sprayed and unsprayed trees through the remainder of the season and failed to notice any difference; they seemed to be all equally damaged by this most destructive pest.

"*Experiment No. 2—Cooper's Soil Fumigant Apterite.*—I tried this mixture on one row, applying it at the rate of $\frac{1}{2}$ lb. to each tree, digging it in over a space of about 2 sq. yds. I closely watched the effect on the beetles, but they appeared to take no notice of it and continued to remain round the trees. It did not even drive them from the soil. I made another application later on in the season, but only with the same results. I noticed while attending to this experiment that if these beetles are exposed to a very hot sun they are killed at once.

"*Experiment No. 3—Quibell's Compound of Tar.*—This mixture, diluted one part to 10 of water, was used as a soil fumigant also. I took a crowbar and made three holes round each tree at a distance of about 15in. to 18in. from the stem. In each hole I poured about a wineglassful of the mixture, the holes being 8in. to 10in. deep. I gave the fumigant a day to get through the soil thoroughly and then carefully examined round the tree, finding plenty of live beetles, but no dead ones.

"*Experiment No. 4—Bisulphide of Carbon.*—I did not carry this experiment very far, as at the time I was using this mixture it was very hot, and the fumes from the bisulphide made it rather disagreeable and possibly dangerous to work with. I think the bisulphide will prove much more effective if used when the curculios are in the larval stage of their existence, which I think is in September-October, as on October 4th last year (1910), while digging under some of my affected apple trees to see if I could find any signs of the larvæ of rootborers (*Leptops Hoper*), I came across some small yellowish-white grubs at a distance of 8in. to 10in. under the soil, and they appeared to be feeding on the small fibrous roots of the apple trees. I did not succeed in hatching any of these grubs so cannot say if they were what I took them to be—the larvæ of the curculio. If possible I will endeavor to further test the bisulphide this coming season.

"*Experiment No. 5—Aphis Traps* invented by Inspector Wallis, Victoria.—I got half a dozen of these traps from Victoria at a cost of 2s. each, and placed them on trees that were being badly eaten by the beetles. I experienced some difficulty in making the traps fit closely to the stem of the trees, but overcame the difficulty and filled up any crevices with a mixture of beeswax and fat. I filled the trough of the trap up with a mixture of Quibell's compound of tar, and went out at night to watch the result. The beetles were prevented

from ascending the trees, but appeared to walk about in any position on the tin trap. They would not cross the mixture in the trough, but they also would not be trapped in it, but collected in numbers under the traps and could be destroyed in this way. (I have since heard that red oil placed in a trough round the trees will trap them in hundreds, but have not been able to verify by testing myself.) If properly looked after, care being taken to see that the beetles had not found some small crevice to get through, and that the trough of the trap was always full of liquid, this device will certainly keep the curculio from getting up into the branches of the trees; but the price of the trap makes it a very expensive remedy, though a small number of traps if red oil proves effective might get rid of a large number of beetles.

Experiment No. 6—Tin Guards.—I had 50 of these made at Simpson and Sons at a cost of about 3d. each. They are made to fit closely round the stem of the tree at the top and to stand away from the tree 1½ in. to 2 in. at the bottom. I placed them on trees that were being badly attacked by the beetles, being careful to close up all crevices with wax. On going to the trees at night no beetles could be found on trees with guards on, though numerous on trees without, and I have noticed this season that trees with guards on show no signs of being attacked by the beetles, though trees alongside without guards are being seriously damaged, the flower buds being eaten out, the young bark on the top shoots being all eaten off. I am so satisfied with the good work the guards are doing that I am ordering 200 to put on in my own orchard, and another grower last year was so pleased with half dozen lent to him that he ordered 50 at once. So far this appears to be the cheapest and best method yet tried.

"In conclusion, I would like to say that I was not at all satisfied with the results of the experiments, and that the pest is one that will have to be seriously grappled with in the South-East, or it will be the ruination of some of the apple orchards in Coonawarra. If possible I would like to devote some time to it again this season.

"RODNEY FOWLER, Inspector of Orchards, S.E."

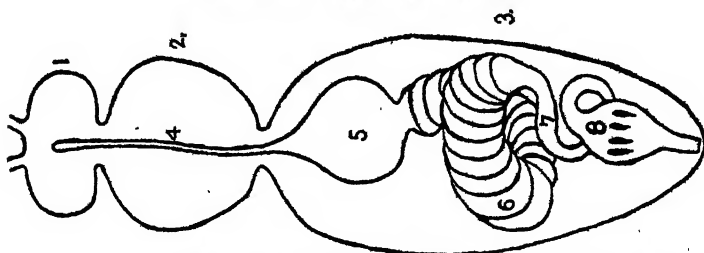
BEE-KEEPING NOTES.

THE DIGESTIVE SYSTEM OF THE BEE.

BY T. E. WHITELAW, INSPECTOR OF APIARIES.

Experienced beekeepers find that a thorough knowledge of the scientific side of apiculture is a material assistance to them in the practical management of their apiaries. The more an apiarist knows of the anatomy of the insect he controls the better he is able to arrange his methods in accordance with their structural requirements. An acquaintance with the digestive organs of the bee has an important bearing on matters of a practical nature, especially with regard to the chyle food which is fed to the young larvæ.

Diagram showing Organs of a Bee.



1. Head. 2. Thorax. 3. Abdomen. 4. Oesophagus. 5. Honey Sac.
6. Chyle Stomach. 7. Ileum. 8. Colon.

The body of a worker bee is arranged in three portions—the head, thorax, and, lastly, the abdomen, containing the principal organs of the digestive system which supplies the vitalising blood. The blood builds up the tissues of the insect and is colorless, having a few white corpuscles. The internal and external structure of the body is entirely composed of a stout, horny substance known as chitine—for bees possess no bones or cartilaginous framework.

From the mouth parts in the head the oesophagus, or gullet, conveys the food matter through the head and thorax to the organs situated in the abdomen. It is a long, narrow tube, about one-fifth of an inch in diameter, and near its commencement are found various glands which play an important part in the feeding of the young larvæ, and also in converting nectar into honey. Upon entering the abdomen it enlarges into what is termed

the honey sac, a receptacle about one-sixth of an inch in depth and one-tenth of an inch in diameter.

Immediately following this sac is the chyle stomach, where the true digestive process is accomplished. Access is gained to this by means of a muscular valve, called the stomach mouth, which enables the bee to manipulate its food in various ways. This valve also serves to strain the grains of pollen from the honey. The chyle stomach is approximately two-fifths of an inch long and has a diameter of about one-ninth of an inch, and curves upon itself. The inner membrane contains the gastric glands, which assist the process of mastication, and has a series of nucleated cells for absorption purposes. At the termination of the chyle stomach are the thread-like Malpighian tubes, to which are attributed urinary functions. The digestive structure now narrows considerably and is known as the small intestine, or ileum, the inner membrane of which is made up of hard, chitinous teeth, further digesting the hard residues reaching it from the chyle stomach. The remaining organ, the large intestine or colon, deals with the final excreta.

The fluid secreted in flowers is not honey, but is composed chiefly of cane sugar and a large percentage of water. This nectar is absorbed by the tongue into the oesophagus, where it comes in contact with secretions derived from the glandular systems Nos. 2 and 3 situated in the head and thorax. The addition of this fluid converts the cane sugar of nectar into the grape sugar of honey. The honey sac serves to hold the honey, which is carried to the hive and regurgitated back through the mouth into the cells of the honey-comb.

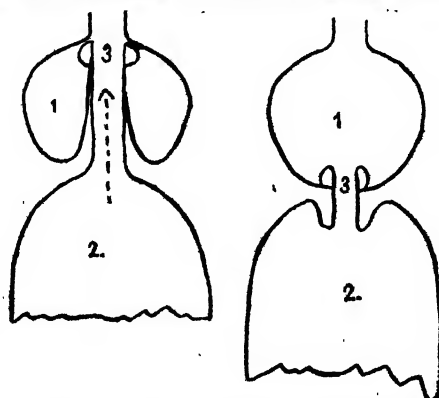
When bees swarm from their hives they are able to carry in their honey sacs sufficient honey to feed themselves for several days. When nutriment is required the muscular stomach mouth is opened and honey and pollen are passed into the chyle stomach, where they are acted upon by the gastric juices and converted into chyle food.

The young larvæ are reared on chyle food, and the manner in which it is conveyed to the mouth without coming in contact with the honey in the honey sac is very clever. The stomach mouth, situated between the honey sac and the stomach, is forced up through the centre of the sac until it reaches its entrance. The chyle food then has a clear passage right through the sac without becoming contaminated with the honey, and is forced out of the mouth and used for feeding. This food in passing through the oesophagus has a secretion from the gland system No. 1 added to it. This gland plays an important part in the preparation of brood food, and is always found active and well developed in the young bees which act as nurses to the larvæ. As they grow older the gland becomes smaller and shrivels, and the bees will then be found working as outside foragers. The queen is also fed to a large extent upon this chyle food, which has a stimulative effect upon her egg-bearing activities.

The residue from the chyle stomach enters the small intestine, and it is here we find the Malpighian tubes, which are supposed to throw off the surplus fluid. Mastication continues, and the color of the contents becomes much darker as it reaches the colon, and eventually the excreta is expelled from the anal opening at the point of the abdomen.

The character of the fæces varies considerably with regard to the nature the food the bees have been feeding on. Should the honey be impure, fermented, or lacking in density, a dysenteric condition is caused. My experience inclines me to the opinion that bees also suffer from a form of constipation, and that it is possible that the infectious disease which at the present

Diagram showing Passage of Chyle Food through Honey Sac.



1. Honey Sac. 2. Chyle Stomach. 3. Stomach Mouth.

time is such a centre of discussion throughout the apicultural world may possibly be in some instances simply a matter of constipation. Should the intestines become unduly distended and the bee is unable to relieve the congestion, paralysis usually occurs. The intestines pressing on the air sacs situated on either side of the abdomen prevent their expansion, and the insect is unable to lower its specific gravity prior to flight and is seen crawling and hopping along the ground.

The fact that young bees act as nurses teaches us that the balance of young workers must be maintained during the early breeding season. Hives used for queen-raising purposes must also have an abundance of young workers, so that the young queen larvæ may have a superabundance of chyle food. Without this they will be deficient in quality and stamina, no matter what their strain is.

THE PHYLLOXERA BOARD.

FINANCIAL STATEMENT.

The following statement of receipts and expenditure of the Phylloxera Board for the twelve months ended June 30th, 1911, is published for general information:—

RECEIPTS.		£	s.	d.	£	s.	d.
To Balance from last account—							
Treasury bills		6,100	0	0			
Cash in hands of Treasurer		1,053	5	4			
Cash in Bank of New South Wales		31	19	2			
Cash in hands of Secretary		3	2	0			
					7,188	6	6
Rates Act, 1910-11—							
Collected by Commissioner of Taxes under clause 20 of Phylloxera Act, No. 724 of 1899		—			1,156	16	0
Interest—							
On Treasury bills		—			212	7	6
					<u>£8,557</u>	<u>10</u>	<u>0</u>
EXPENDITURE.		£	s.	d.	£	s.	d.
By Expenses of the Board—							
Secretary's salary		79	14	4			
Inspector's salary		201	18	10			
Sub-Inspector's salary		77	0	0			
Advertising, printing, stationery		27	1	6			
Travelling expenses		137	8	9			
General expenses		150	18	10			
					674	2	3
Commissioner of Taxes—							
Cost of collecting rates, clerical assistance, &c.		—			60	0	0
Balance—							
Treasury bills		5,440	0	0			
Cash in hands of Treasurer		2,348	15	8			
Cash in Bank of New South Wales		73	7	3			
Cash in hands of Secretary		1	4	10			
					7,823	7	9
					<u>£8,557</u>	<u>10</u>	<u>0</u>

THE WHEAT MARKET.

Following on the conditions obtaining in Great Britain the local wheat market exhibited but little signs of animation during the past month. The highest price touched for farmers' lots was 3s. 7½d. per bushel, but within a few days there was a drop of 1d., the quotation on the last day of the month being 3s. 6½d., as against 3s. 5½d. on the first day.

Writing on September 29th *Beerhom's Evening Corn Trade List* states :—
“ The wheat market has been exceedingly quiet during the past week, buyers being few and far between, and most descriptions of wheat are fully 3d. lower. Stocks at Russian ports have been steadily increasing (which is not surprising considering the small exports during the past two months), and now amount to over 1,500,000qrs., being somewhat smaller than last year's quantity of 1,700,000qrs., notwithstanding the very large exports in August and September, 1910; in 1909 the stocks were only 800,000qrs. It is very probable that the Russian exports will increase during the next two months, but whether sufficiently so to have much effect on prices remains to be seen. The latest information received regarding the yields of this year's crops in importing countries, making allowance for possible over-estimates, points to the requirements of same being some 15,000,000qrs. less than last year. The wheat crop of France is officially estimated at 8,500,000qrs. larger than last year, Italy 5,000,000qrs., Spain 2,500,000qrs., the United Kingdom 1,000,000qrs., and other European countries 1,000,000qrs., or together 18,000,000qrs., and this to a great extent makes up for the deficiency in the crops of Russia and Roumania. The United States and Canada, between them, are expected to ship several million quarters more than last season. Prospects in Australia at the present time are very promising for another large crop, and recently there has been quite a considerable number of vessels chartered for new crop loading. The official estimate of the area sown in the Argentine shows a distinctly larger increase than previously expected. Present prospects are very favorable, although, of course, much may happen between now and harvest time. An average yield per acre on the area sown would result in a crop about 6,500,000qrs. larger than last year. In all probability buyers will adopt a cautious policy so long as the crop outlook in the Argentine continues so satisfactory. Shipments to Europe in the first two months of the season have been more than equal to the estimated requirements, taking into consideration the fact that supplies of native wheat are on a much larger scale during the first few months after harvest than later in the season, but it will, of course, be necessary to make some provision for the winter months, when Ibrail and several of the Russian shipping ports are closed by ice. Canada will, no doubt, shortly export very freely, but from other countries, apart from Russia and Roumania, the weekly totals will probably only be moderate, and it would therefore seem to depend very much on those two countries whether shipments from now to the end of the year are much above the requirements or not. In the early part of next year the Argentine will be the important factor, one way or the other, in the world's exports.”

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Oct. 6	Dull; easy tendency	3/6½	3/7	3/7
7	Steadier, slightly firmer; May-June, 4/5½	Do.	Do.	Do.
9	Quiet, with easier tendency	Do.	3/7½	Do.
10	Opened dull, closed firm; Liverpool not active	Do.	3/6½ to 3/7½	Do.
11	Firm; January-February, 4/6; Liverpool, steady	Do.	3/8	3/6½
12	Firm; January-February, 4/7; Liverpool, May-June, 4/6½	3/6½	Do.	Do.
13	Firm; October-November, 4/6½; Liverpool rather dearer	Do.	Do.	Do.
14	—	3/7	Do.	Do.
16	Late rates, no demand; Liverpool inactive	Do.	Do.	3/6 to 3/6½
17	Firmly held; inactive	Do.	3/8½	Do.
18	Do.	Do.	Do.	Do.
19	January-February, 4/6½	Do.	3/9	Do.
20	Held for advance; Liverpool, September, 4/7	Do.	3/9	Do.
21	Rather quieter; Liverpool, December-January, 4/7	Do.	Do.	Do.
23	Very firm; January-February, 4/7	3/7½	3/9½	3/7 to 3/7½
24	—	Do.	Do.	3/7 to 3/7½
25	Quiet; Liverpool steady	3/7	3/10	Do.
26	Do. dull and neglected	Do.	3/9 to 3/9½	2/7
27	Do. no demand	3/6½	3/8 to 3/8½	Do.
28	Steady, but quiet; October-November, 4/7½	Do.*	Do.	Do.
30	—	Do.	Do.	3/6½ to 3/7
31	Very dull; Liverpool, dull and neglected	Do.	Do.	Do.
Nov. 1	Dull, with easier tendency; Liverpool, no demand	3/6	Do.	3/6 to 3/6½
2	—	Do.	Do.	3/6
3	Dull and neglected	Do.	Do.	Do.
4	Weak, downward tendency; Liverpool dull	3/5	Do.	Do.

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on October 1st:—

BUTTER.

Owing, no doubt, to the climate conditions, there has been a very good supply of cream during the month, and the increase, as compared with corresponding period last year, is most noticeable. The butter has been up to its usual high standard of quality, and the present prices are—superfine, 1s. $\frac{3}{4}$ d. per lb.; pure creamery, 11 $\frac{1}{4}$ d. per lb.

Messrs. A. W. Sandford & Co. report on November 1st:—

BUTTER.—As a result of the dry winter it is now certain that the quantity of butter this season for export will not nearly approach the high-water mark established last year. Meanwhile heavy operations were experienced for South Australian trade, as also in Britain, where values firmed, and this was immediately reflected here in an advance in prices. Towards the end of the month, however, values were disposed to ease in view of the lowering that had taken place in Britain. Best factory and creamery, fresh in prints, from 11d. to 1s. per lb.; choice separators and dairies, from 9 $\frac{1}{2}$ d. to 11d.; medium quality lots, 9d.; stores and collectors, 8 $\frac{1}{2}$ d. to 9d.

EGGS.—The genial weather experienced during October favored additional production in this line, but as South Australian eggs are in good demand for inland as also oversea trade, values practically were sustained. Prime guaranteed new-laid hen, 7 $\frac{1}{2}$ d. per dozen; duck, 7 $\frac{1}{2}$ d.

CHEESE.—The output from the South Australian factories is again substantial this year, and as the standard of quality is well maintained excellent clearances are effected for local and shipping orders. New makes, from 6d. to 7d. for large to loaf.

BACON.—With the setting in of warmer weather an improving trade is being experienced for factory-cured sides, middles, and hams, and prices are disposed to advance; but roughly butchered or medium farm-cured lots are hard to place even at low figures. Best factory-cured sides from 7d. to 7 $\frac{1}{2}$ d., middles 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. per lb.

HAMS.—In *calico*, 10d. to 10 $\frac{1}{2}$ d. per lb.

LARD.—In skins, 5 $\frac{1}{2}$ d. per lb.; bulk, 5d. per lb.

HONEY.—A very active business has been put through for all prime flavored, clear extracted at 3d. per lb., but secondary quality is inclined to drag. Beeswax is saleable at 1s. 3d.

LIVE POULTRY.—The pennings during the month have scarcely been equal to the strong demand that exists for all prime table birds, which realised full values. Good table roosters, from 3s. 3d. to 3s. 10d. each; nice conditioned cockerels, from 2s. 6d. to 3s.; hens and light cockerels, from 1s. 6d. to 2s. 3d.; ducks, from 2s. to 3s.; geese, 3s. 6d. to 4s. 6d.; pigeons, 10d.; turkeys, from 8d. to 10d. per lb., live weight, for fair to good table sorts.

POTATOES.—The turnover has been sufficiently heavy to practically exhaust stocks of Gambier grown, so that at this late period of the season buyers are operating in Victoria for their additional requirements, especially as regards prime quality. Quotations—£3 2s. 6d. to £3 5s. on trucks, Gambier, per ton of 2,240lbs.

ONIONS.—These have been partly supplied from Gambier, but, as the supply there is about exhausted and the Victorian prices have remained unaltered, parcels from Victoria have been obtained. Quotations—£3 5s. to £3 10s. on trucks, Gambier, per ton of 2,240lbs.

RAINFALL TABLE.

The following table shows the rainfall for October, 1911, at the undermentioned stations, also the average total rainfall for the first ten months in the year, and the total for the first ten months of 1911 and 1910 respectively:—

Station.	For Oct., 1911.	A'v'ge. to end Oct.	To end Oct., 1911.	To end Oct., 1910.	Station.	For Oct., 1911.	A'v'ge. to end Oct.	To end Oct., 1911.	To end Oct., 1910.
Adelaide	0.55	18.51	14.15	22.06	Hamley Bridge	0.32	14.58	12.03	19.44
Hawker	0.23	10.25	7.72	16.03	Kapunda....	0.58	17.75	13.27	21.25
Cradock	0.27	9.33	6.75	13.68	Freeling	0.51	15.93	12.44	21.10
Wilson.....	0.27	10.06	6.35	16.42	Stockwell ...	0.45	18.23	14.27	20.26
Gordon	0.56	7.60	6.53	10.81	Nuriootpa...	0.40	19.08	12.07	23.12
Quorn	0.21	12.01	7.18	17.61	Angaston ...	0.47	19.44	18.75	25.66
Port Augusta	0.34	7.95	7.46	16.44	Tanunda.....	0.57	19.81	19.59	25.78
Port Germein	0.58	10.76	9.20	18.96	Lyndoch ...	0.70	20.62	15.89	24.45
Port Pirie ...	0.49	11.32	11.49	23.88	Mallala	0.45	14.95	13.44	19.46
Crystal Brook	0.60	13.41	13.41	20.91	Roseworthy ...	0.42	15.53	11.20	21.02
Pt. Broughton	0.27	12.69	11.39	19.60	Gawler.....	0.38	17.29	11.84	21.80
Bute	0.27	13.72	14.40	22.38	Smithfield ...	0.21	14.55	12.28	21.51
Hammond ..	0.23	9.34	11.15	17.69	Two Wells...	0.50	15.94	10.71	18.44
Bruce	0.55	7.67	6.19	16.60	Virginia.....	0.46	15.71	11.45	22.37
Wilmington ..	0.67	15.76	13.82	23.41	Salisbury....	0.39	16.55	14.82	22.07
Melrose	0.77	23.58	15.21	29.62	Teatree Gully	0.52	24.81	17.17	28.15
Booleroo Cntr	0.14	13.88	9.07	20.17	Magill	0.56	22.73	17.20	24.45
Wirrabara...	0.42	16.56	11.49	25.45	Mitcham	0.54	23.83	16.27	23.02
Appila	0.33	12.77	10.90	24.14	Crafers.....	1.36	42.34	36.80	48.80
Laura	0.39	15.67	13.15	27.54	Clarendon ..	0.85	35.96	26.28	31.96
Caltowie	0.57	14.95	13.78	21.28	Morphett Vale	0.59	21.11	18.05	23.81
Jamesstown ..	0.56	14.94	15.20	22.51	Noarlunga....	0.46	18.30	17.78	23.49
Gladstone ..	0.41	13.86	13.15	19.04	Willunga ...	0.78	23.76	23.49	29.92
Georgetown ..	0.51	16.09	14.21	24.82	Aldinga	0.74	18.17	16.46	23.08
Narridy	0.63	15.00	14.55	19.39	Normanville..	1.08	18.82	17.24	25.85
Redhill	0.55	14.60	12.38	25.51	Yankalilla...	1.36	10.92	21.68	34.32
Koolunga ...	0.66	13.71	12.02	23.74	Eudunda.....	0.45	14.94	13.52	27.79
Carrieton ...	0.21	10.14	8.69	18.78	Sutherland...s	0.34	—	8.07	15.00
Eurelia	0.11	11.24	8.88	18.33	Truro.....	0.47	17.39	14.51	23.85
Johnsburg ...	0.15	8.24	7.19	15.02	Palmer	0.40	—	10.93	19.47
Ororoo	0.08	11.64	7.59	17.86	Mt. Pleasant.	1.04	24.66	18.63	28.69
Black Rock..	0.03	10.19	8.18	18.88	Blumberg ..	0.85	27.12	20.60	29.68
Petersburg ..	0.10	11.00	9.40	16.67	Gumeracha...	1.14	30.18	23.74	34.25
Yongala	0.13	11.75	10.72	17.18	Lobethal....	0.78	32.96	25.21	33.20
Terowie	0.88	11.47	9.98	20.05	Woodside ...	1.17	28.71	25.37	34.09
Yarowie ...	0.53	11.74	11.28	20.45	Hahndorf ...	1.02	32.53	29.38	46.61
Hallett	0.50	14.33	12.41	19.83	Nairne.....	1.24	26.32	25.51	31.19
Mount Bryan	0.42	13.95	11.30	20.48	Mt. Barker ..	1.50	28.44	25.02	31.16
Burra.....	0.67	15.93	13.63	23.29	Echunga ...	1.38	29.86	28.83	35.90
Snowtown...	0.34	13.93	10.19	20.45	Macclesfield.	1.06	27.72	25.52	35.95
Brinkworth..	0.31	13.06	12.33	22.40	Meadows ...	0.92	32.28	30.09	40.30
Blyth	0.68	14.34	14.22	20.02	Strathalbyn.	1.02	17.18	18.17	24.56
Clare	0.50	21.93	19.17	28.78	Callington ...	0.43	14.15	11.39	17.61
Mintaro Cntrl.	0.70	19.99	17.50	36.61	Langhorne's B	0.80	13.62	11.39	22.73
Watervale...	0.79	24.70	20.82	28.05	Milang.....	0.64	15.05	9.85	15.20
Auburn	0.67	21.71	19.40	29.76	Wallaroo ...	0.52	12.45	14.45	18.48
Manoora	0.37	16.40	12.57	26.40	Kadina	0.31	14.46	13.44	18.32
Hoyleton....	0.33	16.32	13.77	19.53	Moonta	0.57	13.71	12.45	15.62
Balaklava...	0.67	14.19	12.83	19.60	Green's Plns.	0.48	14.32	10.36	18.45
Pt. Wakefield	0.77	11.67	14.68	16.25	Maitland....	0.58	18.29	17.18	20.35
Saddleworth.	0.48	17.85	13.08	21.05	Ardrossan...	0.49	12.54	11.45	15.83
Marrabel....	0.33	16.07	10.20	20.91	Pt. Victoria..	0.93	13.69	14.51	16.19
Riverton....	0.31	18.42	15.14	25.26	Currumulka ..	0.88	17.24	14.43	21.93
Tarlee	0.44	15.52	11.87	19.13	Minlaton....	0.87	16.04	13.75	20.15
Stockport ...	0.29	14.36	10.56	16.28	Stansbury ..	1.24	15.51	15.44	19.46

RAINFALL TABLE—continued.

Station.	For Oct., 1911.	Av'ge. to end Oct.	To end Oct., 1911.	To end Oct., 1910.	Station.	For Oct., 1911.	Av'ge. to end Oct.	To end Oct., 1911.	To end Oct., 1910.
Warooka....	1.39	15.37	18.63	21.51	Bordertown .	0.36	17.58	13.28	18.06
Yorketown .	1.29	16.15	15.19	20.65	Wolseley....	0.28	15.70	11.95	19.74
Edithburgh..	1.03	15.00	13.65	21.22	Frances.....	0.94	18.09	17.14	21.52
Fowler's Bay.	0.64	11.26	12.35	10.57	Naracoorte .	0.89	19.95	17.97	24.65
Streaky Bay.	0.96	14.20	15.34	16.29	Lucindale ...	0.86	20.62	20.52	26.92
Pt. Elliston..	0.84	15.05	17.55	19.41	Penola.....	0.80	23.85	22.33	27.89
Pt. Lincoln..	1.53	18.54	16.79	22.20	Millicent	2.38	26.29	29.47	33.96
Cowell	1.51	10.64	10.30	12.14	Mt. Gambier.	2.79	28.09	30.30	37.94
Queenscliffe .	1.36	16.86	—	—	Wellington ..	0.38	13.30	10.77	17.19
Pt. Elliot....	1.32	18.71	15.79	21.21	Murray Bridge	0.46	12.40	9.78	19.74
Goolwa	1.16	15.96	16.75	21.70	Mannum ...	0.27	10.43	6.67	16.53
Meningie....	0.99	17.09	13.76	19.03	Morgan	0.46	7.62	7.18	12.35
Kingston....	1.48	22.09	20.61	27.12	Overland Crnr	0.44	9.46	9.89	16.74
Robe	1.16	22.59	21.07	29.02	Renmark ...	0.41	9.14	9.45	13.91
Beachport...	1.21	24.69	26.66	37.53	Lameroo ...	0.35	—	12.37	17.20
Coonalpyn ..	0.85	15.67	13.10	15.41					



A CAMEL TEAM IN THE INTERIOR.

AGRICULTURAL BUREAU.

TWENTY-THIRD ANNUAL CONGRESS.

Wednesday, September 13th.

(Continued from page 299, October issue.)

FREE PARLIAMENT.

The morning session was presided over by the Chairman of the Advisory Board of Agriculture (Mr. A. M. Dawkins).

NOXIOUS WEEDS.

Mr. W. S. Giles (Mount Remarkable)—“On behalf of the Mount Remarkable Branch I move—‘That in the opinion of this Congress the Advisory Board of Agriculture should use its best endeavors to induce the Government to try to enforce in a proper manner the regulations relating to the destruction of noxious weeds.’ In the opinion of my Branch the destruction of noxious weeds can never be properly accomplished until such time as the power of enforcing the regulations is vested in a central executive instead of in the municipal corporations and district councils, as at present. Noxious weeds are no respecter of persons, and have been known to flourish exceedingly on land belonging to district councillors whose duty it is to see that they are eradicated.”

Mr. C. Ricks (Cherry Gardens)—“I second the motion. Noxious weeds are a source of trouble everywhere, and it is evident that there must be some power besides the district councils to enforce the regulations. Last week the Minister of Agriculture declared St. John’s wort a noxious weed; but what use is it declaring anything a noxious weed when the councils do not enforce the Act? It is absolutely useless for one landowner to attempt to eradicate a noxious weed unless the other people in the district are compelled to take similar action.”

Mr. A. J. Davis (Gawler River)—“I support the resolution. The Mudla Wirra District Council has found a difficulty in enforcing the Act because the adjoining council did not do so.”

The resolution was carried with two dissentients,

STUD BOOK FOR DRAUGHT HORSES.

Mr. H. Billingham (Crystal Brook)—“The subject I have to place before you is the establishment of a stud book for draught horses such as is kept for blood horses. I hold a mandate from my Bureau to bring this matter forward at this Congress. Mr. McEachran has very kindly supplied me with notes for the material which I have to place before you. My Bureau believes, and I think most farmers in South Australia will also believe, that there is a crying necessity for the establishment of a stud book for draught horses, because of the following reasons:—(1) The breeding of draught horses has hitherto been of such an indiscriminate nature that it is almost impossible for most farmers to distinguish a true bred horse from the reverse. (2) It is the only means of ensuring (a) reliability of pedigree at time of sale, (b) purity of blood, (c) proper attention to type and conformation. The subject, however, is bristling with difficulties. In the first place, there are in South Australia three distinct breeds of draught horse—(1) Shire, (2) Clydesdale, (3) Suffolk Punch, and these have, as above stated, been hitherto bred and crossbred just anyhow—most especially the Shire and the Clydesdale. Various schemes may be presented. It may be (1) in the hands of the State, (2) in the hands of the Bureau, or (3) left to the proposed horse-breeding societies. With regard to (1), I do not think the time is ripe yet for this to be a State matter, on account of the fact that there are few (if any) pure-blooded draughts in the State. I think, therefore, that either the local Bureau or horse-breeding society (if such come into existence) should, under the guidance of the leading reputable horseowners and breeders of the district, take the matter up. Owners of horses considered worthy of being placed in the stud book should pay a small fee for registration and enter them. Foals also, from approved mares by approved sires, should be entered as soon as dropped. In this way in a few years a clean and unsullied pedigree could be built up, and then all the local small stud books could be passed in either to a big central committee or to the State, as may hereafter be determined. I hope that something tangible will be done in this matter here and now, and that this Congress will ask the Agricultural Department to urge the local bodies, as suggested, to take up the subject and put into action straight away. I move ‘That it be a recommendation from this Congress that the Advisory Board urge the Branches of the Bureau or some other local body to establish local stud books for draught horses with the ultimate object of obtaining a stud book for the whole of the State.’”

Mr. M. M. Coffee (Redhill)—“I second the motion.”

Professor Lowrie (Director of Agriculture)—“I heartily support the proposal, but I think the best way to achieve the purpose desired is for the stud book to be kept by the Secretary of the Royal Agricultural Society. Mr. Billingham spoke of the local societies registering the horses and then submitting the stud book to a central committee, but if the stud book is kept

by the Secretary of the Royal Agricultural Society there will be no need for that. In New Zealand they have stud books, kept by a secretary who works with a committee of breeders, for all breeds of sheep and cattle, and the system adopted there prevents the buyers of pedigreed stock from being defrauded by unscrupulous breeders. The sooner you get into line with other places, and get the animals certified and registered, the sooner will the quality of the animals be raised. I am sorry that the scheme for the establishment of horse-breeding societies which the Government put forward has fallen through, and I would like the farmers to look into that matter again. Throughout it is a scheme more in favor of breeders of good horses than any other scheme with which I am acquainted. I cordially support the proposal brought forward by Mr. Billingham, and hope that it will be brought to fruition as quickly as possible."

Mr. Billingham amended his motion to read, "That the Advisory Board take steps to bring about the formation of a stud book for draught horses, to be kept by the Secretary of the Royal Agricultural Society, and a committee of management to be appointed from among the breeders," and in this form it was declared carried unanimously.

LAND FOR FARM LABORERS.

Mr. D. F. Bowman (Wilkawatt) moved—"That in the opinion of members of this Congress the Government should, when opening up new country, survey small blocks of fair quality up to about 100 acres, at intervals among the farm blocks so as to encourage farm laborers to take up land and settle in the midst of the farming community." He said—"This subject has been discussed freely by my Branch, and is one that concerns all farmers, especially those who go into new country and have experienced the difficulty there is in getting the labor they require. Men will not go to look for work in these new districts because travelling expenses are too heavy; and then again there is very little accommodation for them even if they do so. If the motion is given effect to, farm laborers will settle in the midst of farmers and consequently get more regular employment, and at any time they are not employed they can devote their energies to improving their own holdings."

Mr. W. J. Tylor (Wilkawatt)—"I second the motion. Anyone living in newly-opened country will sympathise with the suggestion because farm laborers will not go into districts where there is little or no accommodation."

Mr. F. Masters (Bute)—"If the suggestion of the mover is carried out it will resuscitate the homestead block system, which, so far as the supply of labor is concerned, has proved a failure, because the men who took up homestead blocks have been attracted, so far as getting employment is concerned, rather by their trades than by agricultural work. If the members of the Branch which has brought the matter forward think that the carrying of the resolution into effect will prove a solution of the difficulty they have in obtaining farm laborers, they will find it a failure. I oppose the motion."

Mr. W. Pannell (Geranium)—“The last speaker lost sight of the fact that the making of a town is not altogether divorced from agricultural settlement.”

Mr. W. S. Giles (Mount Remarkable)—“I propose as an amendment—‘That the matter be referred back to the Branches for further discussion.’ I consider that if a landowner wants an agricultural laborer on the spot he should set apart for the laborer’s use, say, 20 acres of land and put up a cottage for him.”

Mr. S. G. Smith (Angaston)—“I think the opinion of Congress will be with the last speaker. Surely farmers with large holdings can cut off a few acres on which the farm laborer can have his own house, and on which he can run his cows. The problem has been solved by Mr. G. A. Block, of Freeling, who has initiated a scheme such as that outlined by the last speaker. The landowners in the district are taking steps to provide their men with cottages, which they are building for them, charging them with interest on the cost of construction.”

The amendment moved by Mr. Giles was carried.

ADDRESSES BY EXPERTS.

Mr. B. Collins (Mount Gambier)—“I move—‘That more time at the Annual Congress should be devoted to addresses by experts attached to the Department of Agriculture.’ Delegates will agree that, though some of the papers given by farmers are very good, they are not of such an educational character as the addresses given by the experts of the department. The time has arrived when the man on the land is thirsting for expert knowledge to assist him, and I look upon these Congresses as a great school, the delegates being the scholars and the experts the teachers. We cannot expect the experts to visit all the Branches in the State, but at such Congresses as this they have the opportunity of addressing delegates from all the Branches. For that reason it has been suggested by my Branch that all the time at the Annual Congress, except that set apart for the Free Parliament, should be devoted to addresses by the experts of the department.”

Mr. W. G. Secker (Lucindale)—“I second the motion. If the experts are given more time and some of the other items are cut out I am sure we will gain more information at future Congresses.”

Mr. J. A. Lock (Keith)—“I think we have got a good deal from the experts at this Congress. If the Congress has to be run by the experts it will mean very hard work for them. We are, of course, delighted to hear what they have to say, but I think we should be prepared to do our own part.”

Professor Perkins (Principal Roseworthy Agricultural College)—“May I say, as a member of the staff, that, while we appreciate the motion brought forward, we took the view that the farmers attending this Congress desired not only to hear addresses by the staff, but also the views of the different Branches on the subjects discussed, and we thought that the arrangements

this year struck a fair balance. They provided for four departmental addresses and five addresses by members of Branches. We would, of course, be very glad to occupy the whole of the time, but I do not think that would be altogether to the advantage of delegates. The experts of the department are always prepared to take part in the discussions, and that is almost as good as an address. While we take the motion as a compliment, I would suggest that it should be withdrawn."

The motion was negatived by a large majority.

THE FOX PEST.

Mr. P. J. Curnow (Wirrabara) introduced a discussion on the best means of coping with the fox pest. He said—"We have a difficulty in my district in finding out the best method of laying poisoned baits so that foxes will take them. We have found that when the foxes take strychnine baits they do not die on the spot."

Mr. R. Jackson (Kingston)—"I find it best to put down two baits. The foxes generally eat one and carry the other away, and they do not go far before they die."

A Delegate—"I suggest that if the poison used is strychnine that water should be put close to it. The fox would be sure to have a drink and would then soon die."

Mr. S. Nairn (Stockport)—"It will be generally found that foxes will follow a beaten trail or track, and my method has been to drag an old sheepskin or carcass behind a dray and drop the baits out here and there. Then, if a fox takes the bait his body will be found not very far from the track."

VETERINARY SURGEONS IN COUNTRY DISTRICTS.

Mr. H. M. Pascoe (Whyte-Yarcowie), in moving "That, in the opinion of this Congress, the Government should appoint veterinary surgeons at various centres throughout the State," said—"As the Minister in his address at the opening of Congress intimated that it was his intention to appoint veterinary surgeons at various centres, it is not necessary that I should make out a case for my motion. If, however, it is carried it will show the Minister that he has behind him the support of Congress."

Mr. R. Ward (Whyte-Yarcowie) seconded the motion.

Mr. Lauterbach (Woodside)—"I agree that more veterinary surgeons are required in the country districts. Last year one of my customers lost eight cows, and if there had been a veterinary surgeon available he would probably have saved most of them."

Mr. C. Fowler (Yongala Vale)—"I have very much pleasure in supporting the motion. The question was brought forward by the Yongala Vale Branch a long time ago. If veterinary surgeons are appointed care should be taken to see that the men selected are well qualified."

Mr. J. W. Lines (Appila-Yarrowie)—“I think it is high time that the country districts had a little more attention from the veterinary surgeons, and that more should be appointed.”

Professor Lowrie (Director of Agriculture)—“The veterinary surgeons are under the Stock Department; but this question of providing veterinary surgeons throughout the State is something very much larger and more expensive than the majority of men think. There are two proposals in connection with the matter. One is the subsidising any subscriptions raised by the farmers themselves in any district towards guaranteeing a paid sum to a veterinary surgeon, who would charge fees for his services. That system obtains in New Zealand. The farmers in certain districts there guarantee a veterinary surgeon from £300 to £700 per annum, but when he attends cases he charges his ordinary fees, of which a record is kept, and if those fees do not at the end of the year come up to the amount guaranteed the society which engaged him has to make up the balance. That system does not work so well in New Zealand as many of you may think. There are differences in the personality of the men connected with every profession. Some men get on and do good work, but there are other men in whom the farmers lose confidence, and in the latter case it results in the societies having to make up a large part of the amount guaranteed. Then again, I do not think the population of this State is dense enough to allow of that system being adopted. Supposing the State was divided into areas of 40 miles radius. If at any time the veterinary surgeon was 40 miles away from the place where he was required, and the train only ran to the place once a day, the probabilities are that the animal affected would be dead before he got there, but his fee would still have to be paid. I do not think, therefore, seeing that our rural population is so widely distributed, that the system in force in New Zealand would be best for this State. Another objection to the New Zealand scheme is that a veterinary surgeon working for fees naturally likes to make it necessary for the farmers to send for him, and therefore does not care to teach them too much. On the other hand, if a veterinary surgeon is a public servant appointed to teach the farmers to help themselves he can be made a very valuable man. The scheme I favor is that the veterinary surgeons should be paid by the Government, that their districts should be allotted them, and that they should visit the various towns in their districts at specified dates. They could on those visits give addresses to the farmers and show them how to treat any cases that might need attention; but if that scheme is adopted it should be understood that the veterinary surgeon is not working for fees, but to keep the stock in his district healthy, and to teach the farmers how to treat their stock in case they should become affected with colic or any other ordinary ailment. The question, however, is—would the veterinary surgeons accept positions like that, because theirs is a highly skilled profession, and you must bear in mind that the course necessary to become a veterinary

surgeon takes the same time as to obtain the degree of doctor of medicine. That has to be recognised; but, on the other hand, the veterinary surgeons should see that, with the population of the State distributed so widely as it is, it will not be possible for them to get a living in the country if they keep their profession as a private enterprise profession. In the Agricultural College in New Zealand they have a veterinary engaged in teaching young farmers. He runs a practice, but his fees are paid to the Board of Governors, the only condition being that farmers who require his services shall bring to the college a trap capable of carrying two students, who are then taken out to the place where the animal is and instructed how to treat it. Possibly something of that sort might be introduced here. To appoint veterinary surgeons throughout the State would be very expensive, and it would be far better to secure the services of four or five veterinary surgeons, who would, while prepared to treat stock, also be ready to teach the farmers how to keep their stock healthy. Farmers will then have their own little veterinary cabinets, and we would hear less of mysterious diseases than we do at present." (Applause.)

Mr. Pascoe amended his motion to read—"That it be a recommendation to the Advisory Board of Agriculture to request the Government to station duly qualified veterinary surgeons in various districts, with a view to their holding veterinary study classes, and generally looking after the health of the stock in the district."

The motion, as amended, was carried with but one dissentient.

RAILWAY EXCURSION TICKETS.

Mr. T. Hawke (Willowie)—"I wish to direct attention to the matter of the excursion tickets issued by the Railways Commissioner for the show. The tickets issued this year are only available for two weeks. I move—'That the Advisory Board request the Commissioner of Railways to extend the duration of excursion tickets issued for the show so as to permit of the return journey being completed within four weeks from the date of issue, with the right to break the return journey at any station.'"

Mr. A. T. Noll (Quorn) seconded the resolution.

Mr. G. R. Laffer—"According to the present regulations if a passenger gets out at any station before he reaches the city he has to forfeit both halves of his ticket. I think that is most unfair. I do not think that in such a case a passenger should be called upon to forfeit more than the first half of the ticket." (Applause.)

With the consent of the mover the following words were added to the resolution:—"Also that the Advisory Board shall urge that in the case of the forward journey being broken that only the first half of the ticket shall be surrendered."

The motion, with the addendum, was carried unanimously.

PERCHERON HORSES.

Mr. D. F. Bowman (Wilkawatt)—“I move—‘That the Advisory Board ask the Government to import into South Australia horses of the Percheron breed.’”

Mr. A. Bothwell (Davenport)—“I second the resolution. The Percheron horse originally came from the north of France, and it is supposed that the breed, which is a distinct one, is the outcome of a cross with a country-bred mare and some Arab stock. I am of opinion that it would be a distinct advantage if the Government introduced the breed to this State, as so far as I can learn they have proved a profitable investment wherever introduced. They have good substance and are active.”

Mr. Billingham (Crystal Brook)—“I oppose the motion. I do not think we should go to the Government for everything we want. If the Percheron horse is anything like what has been stated there should be plenty of horse-breeders in the State with sufficient capital to introduce the breed as a private speculation.”

The motion was lost.

THE CHAPMAN SACK.

Mr. J. Brown (Port Elliot) moved—“That this Congress requests the Advisory Board to approach the Railways Commissioner with a view to securing an alteration in By-law 129, to admit of the carriage of grain in the Chapman sack at ordinary rates irrespective of weights.” He said—“It sometimes happens that a bag of wheat put on the truck goes over the 200lbs., and in such cases the person who puts it on is penalised by the Railway Department.”

Mr. F. Masters (Bute)—“I second the resolution. It is unfair that the users of the bags, who have nothing to do with their manufacture, should be penalised if they happen when full to go over the 200lbs.”

The motion was carried unanimously.

SELLING BEEF BY LIVE WEIGHT.

Mr. Brown (Port Elliot) introduced the subject of selling beef by live weight. He said—“The practice has been carried on in Scotland for the last 40 years, and I can see no reason why it should not be adopted here. In Scotland they draft the cattle in a small yard and put them on the weighbridge, and it results in no loss of time.”

Mr. G. Nicholls (Secretary of the Advisory Board)—“The Port Elliot Branch submitted a resolution on this matter to the Advisory Board some time ago, and the Board, after making full inquiries, did not think they could do anything in regard to the question.”

Mr. J. A. Lock (Keith)—“I suggest that the matter be brought before the various Branches, with a view to its discussion. I will move in that direction.”

Mr. J. Malcolm (Kadina)—“ I second that resolution.”

Mr. Brown (Port Elliot)—“ I am quite agreeable to that course being adopted.”

The motion was carried.

FREE CARRIAGE OF IMPLEMENTS FROM FIELD TRIALS.

Mr. W. Pannell (Geranium)—“ I move—‘ That the Commissioner of Railways be asked by the Advisory Board to grant the free back carriage of implements sent to field trials.’ My Branch has had field trials for the last two years, and we have endeavored to obtain from the Railways Commissioner the free return carriage of the implements or some concession on the rates charged, but up to the present we have not been successful. A field trial is of far greater value than is an implement show, and I think field trials will become increasingly popular. The manufacturers of implements have pointed out that they have to go to considerably more expense in sending implements to a field trial than they have in sending the implements to agricultural shows, and it was on their advice my Branch took the matter up.”

Mr. J. Malcolm (Kadina) seconded the resolution, which was carried.

RAILWAY DEMURRAGE CHARGES.

Mr. J. B. McDougal (Morchard) introduced the subject of demurrage charges at railway stations. He said—“ People living more than seven miles away from a railway station are allowed a week in which to remove their goods.”

A Delegate—“ No ; they are not.”

Mr. McDougal—“ That is what I have been told. I understand that if a man lives more than seven miles out he is allowed a week, but if he lives nearer the station than that he is only allowed eight hours before demurrage is charged. At most of the country stations there is plenty of space in which to put the goods, and, though demurrage rates may be necessary in Adelaide, there is no reason why they should be imposed in the country districts. I move—‘ That this Congress protests against the demurrage rates now charged at country stations.’ ”

Mr. W. Toop (Morchard)—“ I second the resolution.”

Mr. A. J. Davis (Gawler River)—“ I think if the time allowed for the removal of goods is extended it will meet the case. I move as an amendment—‘ That the Railways Commissioner be asked to extend the time allowed for the removal of goods at country stations before demurrage charges begin.’ ”

A Delegate—“ There is a shortage of trucks in the wheat season now, and if no charge is made for demurrage the position will be worse.”

Mr. McDougal (Morchard)—“ I am referring to the charge after the goods are unloaded.”

A Delegate—"That is not demurrage; it is storage."

Another Delegate—"They call it demurrage."

The amendment was carried.

THE RESOLUTIONS.

Mr. G. R. Laffer—"As a member of the Advisory Board, I want to be perfectly clear as to the Board's position in regard to some of the resolutions that have been carried. In regard to the resolution referring to the Chapman bag, for instance, the Railways Commissioner may state when we ask him to give effect to that resolution that it affects the policy of the Government, and that therefore he cannot do anything in the matter. In such a case does Congress want us to go further and approach the Government? Probably the same thing may apply to other resolutions."

It was resolved that the Advisory Board be empowered to approach the Government in the event of such a course being necessary in order to carry out the wishes of Congress as expressed in the resolutions carried.

Evening Session.

The President of the Advisory Board of Agriculture (Mr. A. M. Dawkins) presided.

THE GROWTH AND UTILISATION OF SUMMER FORAGE CROPS.

Mr. W. J. Colebatch (Superintendent of Agriculture in the South-East) addressed the Congress on the subject, "The Growth and Utilisation of Forage Crops." He said—

"As I heard the subject of my address announced I wondered whether some of the Northern and West Coast farmers would not think that the department had just about gone mad on the question of forage crops. I am not sure that it would not be a good thing to go mad occasionally on something of that kind. It has struck me as rather a remarkable thing that at a Congress of farmers of South Australia, the wheat-growing State of the Commonwealth, so much time should have been given to the consideration of the growth of forage crops. Another remarkable thing is that the Director of Agriculture (Professor Lowrie), Professor Perkins, and myself, who have been abroad, should have all come back to this State with the same conviction—that the point of weakness in South Australian agriculture is the absence of mixed farming. It is in the growing of forage crops that there has been more neglect than in any other phase of agriculture.

SOME STRIKING STATISTICS.

"We all admit that so far as wheat-growing is concerned South Australia has achieved more, probably, than was ever expected, and undoubtedly stands ahead of the other States in that particular; but the farmers, in concentrating their attention on cereal cropping, have overlooked the value of

green fodders. The Commonwealth statistics bearing on the question support this statement. In the first place it is worthy of notice that prior to the year 1908 the amount of land under green fodder crops was so insignificant that apparently the statistician did not keep a separate record of it. According to the statistics for 1908-9, South Australia in that year grew less than 1,250 acres of maize as compared with Victoria, which grew 14,000 acres, and New South Wales 180,000 acres. Then, as regards the total acreage under green forage for that year South Australia was a long way behind any other State of the Commonwealth, the figures being New South Wales, 235,000 acres; Victoria, 63,000 acres; Queensland, 87,000 acres; and South Australia, 16,086 acres. I will not say that this State can expect to rival some of the other States, which are naturally better adapted for the growth of forage crops; but it must be admitted that these figures are far from being creditable to South Australia.

WHAT IS THE POSITION ?

" I wish to make it clear that I recognise that in a very large area of South Australia it will never be possible to grow much green fodder; but, on the other hand, there is a very large area in this State where green fodder can be grown successfully, and, in addition, there is a large area in which experiments will have to be conducted before anyone can say whether it will grow there or not.

" What, however, is the position ? We find that, even in some of the ideal dairy districts in this State, the butter factories have to close down during the winter because there is not sufficient forage to keep the cows going throughout the year. In the district in which I am working I am dealing with a class of land that requires to be worked, not as the farmers in the North work their land in order to conserve the moisture, but to take the rankness out of it and to bring it into a better physical condition. In any district where a scarcity of moisture has not to be contended with there is no cheaper way of carrying out the summer working of the land than by growing forage crops as true fallow crops.

" As you can see, my story is one of intense culture. I was told at one time, before I joined the Public Service of this State, that it was of no use coming to South Australia to talk about anything except wheat, because the farmers did not want to hear about forage crops and grasses; but your attendance to-night shows that interest is awakening among farmers in that direction. I would fain believe that your attendance at these lectures is not brought about simply from a sense of duty to the various Branches you represent, but from a desire to hear something further about the growth of forage crops with the idea of bringing the matter before your Branches when you return home.

CAREFUL CULTIVATION NECESSARY.

"A point which Professor Lowrie mentioned last night, and which I desire to refer to again, is that in growing all crops you must treat them as crops worth growing. I do not think any of you would expect to get good results from simply breaking up a piece of land and broadcasting wheat on it without manure; but that is practically all the trial that has been given to summer crops in many districts. Summer crops are voracious feeders, and need to be sown on land in even better heart than is required for cereal crops; and I may say that to grow summer crops properly requires more intelligence and greater skill than does the growing of wheat. It is not possible for me to state the extent to which summer crops may become a feature of our production; but certainly in a large portion of the Lower North and a proportion of the Middle North, and all through the South and South-Eastern districts I think forage crops will become a more important feature than they have been in the past, chiefly on account of the growing demand for dairy products and an increasing knowledge of dietetics. Farmers are beginning to realise that slipshod methods of feeding stock will not do, and that the only way to improve the quantity and quality of animal products is by raising forage crops.

THE OBJECT OF GROWING FORAGE CROPS.

"Let us consider the object of growing forage crops. In the first place it is to supplement the natural pasture by raising succulent food at a time when that class of feed is scarce, and it is important to remember that the same quantity of feed is found to be more valuable when in a succulent state than when in a dry state. Again, by grazing forage crops you can not only get your stock quicker to a high state of profit and maintain them at it, but you can also, in course of time, increase the stocking capacity of the land. The growing of the crops, the extra working of the land, and the droppings of the animals all tend to increase the stocking capacity of the land. I have already referred to the effect of forage crops in cheapening the cost of fallowing, and in certain districts it would no doubt pay well to grow forage crops simply for the purpose of turning them in and using them as green manure. For this purpose some of the more prolific growing plants, such as mustard, have given better results on light soils than legumes. It is to the small farmer that the growing of forage crops should appeal strongly. Men on small holdings must turn their attention to that phase of agriculture, as it is only by adopting methods of intense culture that they can hope to be successful. Both for dairy-farming and the raising of fat lambs forage crops are of the utmost importance; and, whilst the lamb industry in this State has grown very much of late years, you will admit that we have a long way to go before we reach the limits of the productive capacity of South Australia in that respect.

THE CROPS TO GROW.

"In choosing forage crops it is necessary first of all to consider what crops are most likely to suit the climatic conditions of the district, and, secondly, the crops that will return the greatest possible amount of feed units—not the greatest tonnage per acre. The digestible nutrients are the factors which determine the feeding quality of the crop, and they vary considerably in amount. Sorghum, for instance, does not contain anything like the same amount of albuminoids that are available to animals as maize or Japanese millet; consequently you may get a greater food value per acre in a maize crop than in a crop of sorghum of greater tonnage.

"I am not going to run through the whole gamut of fodder crops to-night, but I want to deal with one or two of the principal forage crops of which I have had personal experience.

RAPE.

"Let me first take rape. Rape, where it can be grown successfully, is, I think, without doubt absolutely the best crop to grow for the fattening of stock. Fully 75 per cent. to 80 per cent. of the Canterbury frozen lambs are fattened on rape paddocks. There is no doubt that rape, particularly when spring sown, cannot be beaten for rapidity of fattening. In the North you are restricted to sowing at one period of the year, but in the South rape can be sown in the autumn or spring, but it must be sown on land that is in good heart. Never attempt sowing rape on land that has been continuously cropped, and thereby exhausted; it would be far better to leave the seed in the bag. The soil should be well manured, though the dressing may be reduced in the case of land that has carried a crop of peas or beans. One of the bulkiest crops of rape I have ever grown came off a field in which peas had been fed down. Rape does not always germinate evenly, but farmers should not be too quick in disturbing the paddock if they get a bad germination. The seed is small, and lies a long time unharmed, and it would be well to let it have a second chance of coming through before cultivating up and reseedling. When sowing rape it is well to give it a good start with manure. I know that in the North farmers have to be careful in using acid manures, but in the South and South-East it can be sown with superphosphates or bone super., and if the crop is not doing too well it can be stimulated by a top dressing of nitrate of soda or sulphate of ammonia.

"In feeding rape one or two precautions have to be borne in mind. It is not a crop which can be fed without some amount of judgment. Rape which is spring sown is of a very forcing nature, and if sheep are brought on to it too hungry they are very apt to scour, and, in some cases, to succumb to gastric and intestinal congestions and inflammations. To avoid this it is often the practice to have the rape paddock only partly sown or adjoining a paddock which is carrying a good sward of grass so that the sheep have

access to lea whilst feeding rape. While the sheep are being fed under those conditions it is as well to give them plenty of dry feed and some salt. They do not as a rule require water. When the weather becomes broken with rain or sleet they should be moved off and given a change of feed. Towards the end of the grazing they require watching, as they are apt to get cast between the rows. In the South-East rape can be sown in either the autumn or the spring, but where I am, though we can sow all right in the autumn, the trouble is that we would have difficulty in getting on the land to feed it off. If it is autumn sown it should be put in early, say the beginning of April, or even the latter part of March. Spring sowing should be in September or October; and I may be wrong, but I can see no reason why in some of the more favored districts lambs should not be dropped in the spring, and then rape sown, say, in September—would fit them nicely for the freezing chamber. If rape is not fed too close the first time it produces a good second growth, and in countries like Australia, where it is fed off before it gets to a big head, there is not the same risk with the second growth of rape as there is in colder countries. Under our conditions there is not much more risk from the second growth of rape than there is from the first crop. In regard to spring rape in the South-East, unless it can be sown fairly early I am afraid there is a great risk from blight. My experience at Kybybolite is that plant lice will take the whole thing off in a very short time if they once get a start.

KALE.

“For that reason I would emphasize the importance of having a large proportion of the forage crop area sown to kale. Personally I have restricted the rape area very considerably, and have gone in much more largely for kale as sheep-feed. Kale has several advantages over rape. I do not think it is so fattening, but it has the advantage that it stands right through the season and right through the following winter, and comes again very early in the spring, when feed is scarce. It thus provides an opportunity of spelling some of the pastures. That, I think, compensates for its reduced amount of fattening virtue as compared with rape. It yields a greater quantity of forage than rape, but it takes more kale to put the same condition on sheep. Kale is also a true fallow crop; rape is not, because it is not cultivated between rows. With kale there should be 2ft. or 3ft. between the rows, and the land should be well worked. It is a much safer feed than rape. It is less irritating to young stock and is less forcing. In the North kale should be sown in the autumn, and in the South-East it is nearly always sown in September; and the proper way to feed it is to turn the stock into the paddock without any hurdles, because it must be fed more lightly than rape. The second feeding should be particularly light, as the winter weather will destroy plants that are eaten right down to the stalks,

SORGHUM.

"Sorghum, maize, and millets form another class of summer crop, and they will appeal to farmers over a wider area perhaps than rape and kale. Sorghums are likely to have a much larger range of cultivation than maize, though where maize can be grown it is preferable as a fodder crop for several reasons. Maize is a richer plant and a stronger plant, and it makes a better class of green fodder and silage, and there is not the same danger in feeding it green as there is in the case of sorghum. There are a number of types of sorghum, but the two main groups are known as sweet and non-saccharine, those containing less than 10 per cent. sugar being classed as non-saccharine and those over that percentage as sweet. Of the sweet sorghums those most likely to be useful are Early Amber sugarcane, Early Orange sugarcane, Planter's Friend, Early Undendibule sugarcane, Folger's Early, and Sorghum saccharatum. These sweet sorghums have this advantage over maize: they give a good second growth, whereas with maize, except where it is irrigated, there is very little second growth; but farmers always seem to fight shy of sorghum because of the danger of feeding stock on it in certain stages of its growth. It is, however, a crop which can be managed satisfactorily if discretion be shown. We know from practical experience that sorghum which has been in any way stunted in its growth is likely to be unsafe for grazing, but there is not so much danger in districts where there is a heavy rainfall or where it is grown under irrigation; but sorghum loses its poisonous properties in a few hours after it is cut and stacked or placed in silo. It is also safe to feed after the seed begins to form, but if seed formation is allowed to go too far, the amount of fodder in the second and third growths will suffer. Sorghum, being a true fallow crop, is grown so that the land can be worked between the rows. It prefers light land, but the soil must be fertile. If cultivated early between the rows and kept so cultivated, I do not think farmers will have much difficulty in districts where the rainfall is 18in. or over in raising good crops of sorghum, and even where the rainfall is only 15in. it is still worth growing. That brings us to a consideration of the results obtained by Professor Perkins at Roseworthy. Professor Perkins has shown that summer-cropped land yielded 5½bush. per acre less than land that had been bare fallowed. Whilst that may be so, I still think that on land such as farmers have to deal with in the Lower North they would do well to grow a crop like sorghum even if it is going to reduce their wheat yield, because by doing so they will improve their land in other respects. Where the crop is grazed off a second stubble is ploughed in, and thus stores of plant food which lie far below the range of the ordinary cereal crops are added to the surface soil. Farmers must recognise that we will arrive at a stage when the depreciation of organic matter by constant bare fallowing will become a serious matter, and anything that will stave off that evil day is well worthy of consideration. As regards the crops of sorghum

grown at Roseworthy College, it has also to be remembered that it is often very difficult to get the cultivator at work just when required most, as hay-making and harvesting operations claim first consideration. Coming down further south, where, of course, moisture is not so important a matter, the argument in favor of sorghum is undeniable. So far as my district is concerned, there is no crop that can compare with it as a forage crop. Not only is it a safe feed there, but it gives two or three cuttings a year, and also provides feed just at that time when the paddocks are bare.

"As to the non-saccharine sorghums, we do not know much about their relative values under South Australian conditions. There are three groups, viz., the Kaffir corn group (including Red Kaffir corn, White Kaffir corn, White Milo, and Blackhulled White Kaffir corn), the Durras or Dhouras (including Yellow Milo, Jerusalem corn, and Brown Durras), and the Broom corns. The Kaffir corns are grown chiefly for seed and are not adapted to our purposes. The Durras or Dhouras group, however, which are grown chiefly for forage, are worth trying. While I have grown all the varieties, the only ones I have had much success with are the Jerusalem corn and Yellow Milo. The others did not give a bulk of fodder, and they have a tendency to get rather coarse in the stalk. The Durras are more delicate than sweet sorghum in the early stages, and are not so palatable or nutritious. They grow luxuriantly when established, and show great powers of secondary growth. They come midway between the sweet sorghums and Indian corn.

"Broom corns grow well under the conditions in the South, but they are not so valuable as fodder, nor are they so palatable as the sweet sorghums.

MAIZE.

"Maize is not likely to be grown far North without irrigation, but in the South and South-East it should be grown very much more than it is; and it is the crop which I expect will in the future go a long way in improving the dairying industry at Mount Gambier. It is a strong, vigorous plant that grows rapidly during the summer months. It is palatable and nutritious, and can be fed as a green fodder without any fear of ill effects, and it also makes the best ensilage. It is a crop which, compared with the other classes of fodder I have mentioned, is very rich in food elements. All classes of stock do well on it, but it is especially suitable for dairy cattle. Like all the crops I have mentioned, maize is susceptible to heavy frost, and it is therefore unwise to sow too early. It yields a big bulk of forage—from 15 tons to 20 tons per acre would be nothing in the Mount Gambier district. I have grown 12 tons myself within five miles of Melbourne on very second-class land. I am quite sure that with the class of land at Mount Gambier it could without much trouble be made to yield 30 tons per acre. I am not a hard and fast advocate of the drilling system for maize in proper maize-growing districts,

In districts which are not particularly suitable for maize farmers cannot afford to take liberties by broadcasting it, but where it grows well I am not at all sure that broadcasting will not hold its own with drilling. In the Mount Gambier district farmers can grow in a small area enough maize to supply them with forage in the form of green stuff and silage all the year round, and there is no reason why any of the factories should have to close down during part of the year owing to the want of feed. I am sure that farmers will have to conserve forage in the form of ensilage to a far greater extent than they have up to the present, and for the Mount Gambier district maize is the best crop to ensile. Providing it is not left too long before it is cut, cattle will eat up every morsel of it. Of the maizes which may be grown for forage purposes, those which have given the best results are Yellow Moruya, Hickory King, Victorian Flat Red, Sibley, Early Red Hogan, Eclipse, and Boone's County Special.

MILLETS.

"There are four great groups of millets, viz., Barnyard, Broom corn, Pearl, and the Foxtail millets. Of them all the only one which has given me satisfactory results is the Japanese millet. Probably they will do better further south on land that contains more humus. The cultivation required is similar to that given to sorghum. They do not give a great bulk of forage, but if cut early in a good season they give a good second growth. Even if they would grow well they are not suitable for the North as they require even moister conditions than sorghum, and, furthermore, they leave the land even drier than sorghum.

"If by bringing the question of the growth and utilisation of forage crops forward by this address or I have in any way created interest in the subject, I am glad to have had the opportunity of speaking at this Congress." (Applause.)

Replying to questions Mr. Colebatch said that 1lb. of albuminoid matter fed to stock in a succulent form would give a better return than 1lb. of albuminoid matter fed in the form of dry fodder. They would get more value out of maize by making it into ensilage than by making it into hay. The usual amount of rape seed sown was from 2lbs. to 5lbs. per acre; but on really good land a sowing of 3lbs. per acre would be ample. The quantity of maize to be sown per acre depended largely on the size of the grain, and also whether it was broadcasted and ploughed in or drilled in. If it was broadcasted half a bushel to the acre would probably not be sufficient. He thought, however, that on the average from 25lbs. to 30lbs. would be a fair seeding. If sown too thin the stalks grow too coarse and fibrous to make first-class fodder.

A Delegate—"On the Murray Flats we find that the most successful system of sowing maize is to broadcast it and plough it in, and we use about

a bushel per acre. Yellow Moruya and Hickory King are the best to grow in that district."

EXPORT OF EGGS AND TABLE POULTRY.

Mr. D. F. Laurie (Poultry Expert) addressed the Congress on the "Export of Eggs and Table Poultry." He said—

"I have come here to-night to ask you as members of the Agricultural Bureau to assist me in getting outside markets for your eggs. This is not the first time I have called your attention to the fact that it is absolutely necessary that additional markets for the egg production of South Australia should be secured. Since the first issue of the *Journal of Agriculture* I have in that publication repeatedly directed attention to the matter, and so far back as 1894 I asserted that it would be necessary to export eggs to oversea markets. In the Adelaide market in 1905 the price of eggs ranged from 5½d. to 6½d. per dozen. In 1906 the price dropped to 5½d. In that year a shipment was sent to England, under various difficulties, and the prices realised were satisfactory. In 1907 three further shipments were made and averaged 7½d. per dozen, which was better than the average price ruling in Adelaide during that year. Since then, however, there has been a battle, because as soon as the shipping season comes round the local market, strangely enough, goes up, and as soon as the season closes it goes down just as suddenly and strangely. The marvellous demand in the other States, in regard to which so much is said, disappears as soon as the last ship for the season has sailed. As a matter of fact there is no such demand in the other States. It is all done for a purpose. I have studied the matter, and I know what I am talking about. The egg production of this State demands that oversea markets should be obtained.

PRODUCERS' ASSISTANCE REQUIRED.

"But the Government cannot establish outside markets unless the producers help them to do so. The poultry industry is capable of indefinite expansion, and I am perfectly certain that the market for eggs is improving; in fact, I say without hesitation that in regard to no product can we look forward with so much certainty to a larger demand and increased prices as we can for eggs. The market in England is of course rapidly improving. Canada years ago exported eggs to England largely, but the increase of population in that country has resulted in all the supply being consumed locally. The United States have a very small surplus to export. Generally speaking, countries which used to export eggs to England are ceasing to do so, with the result that during the last seven or eight years the average price of eggs in the old country has shown a gradual increase. I am anxious, so that the producers may get the benefit of the increasing demand, to make further shipments to England this year if space can be secured. At one time during

the seasons of drought I received a good many letters, in which the writers told me that if it had not been for the fowls they would have starved. The good seasons which have ruled since then have caused the farmers to neglect the fowls, but the time may come again when they will be needed.

POINTS WORTHY OF ATTENTION.

"I want the members of the Bureau to help me in opening up the overseas market by sending in eggs for shipment, but if they cannot assist me in that direction will they do so as regards improving the quality. In the present circumstances it is a difficult matter to buy from the storekeepers, because such a large percentage of the eggs are bad. To my mind the selling of rotten eggs is nothing short of robbery. I will go further and say that the man who takes advantage of an egg having a shell which hides its condition and sells another person a rotten egg is a skunk. It is impossible to build up a trade with rotten eggs, and I want your help and influence in that matter. Another point is the grading of eggs. In shipping eggs to England we practically sell them by weight—they are sold by the long hundred, viz., 120 eggs, and the 2-oz. eggs are recognised as the standard. We have found that by grading the eggs we can get a penny per dozen more for the large ones than we get if they are mixed together irrespective of size. In connection with the egg-laying competitions I some time ago established a regulation that any pens laying eggs less than 20ozs. in weight are ineligible for a prize. Those who sell eggs therefore should see that they are properly graded and also clean. Fowl dung is full of micro-organisms, and the shell of the egg being porous those organisms, if the egg is left in a dirty state, will get into it. I cannot understand why people do not wash the eggs. If the dirty eggs are put into a bucket or other receptacle and water poured on them and let stand for 20 minutes or so the dirt will drop off. Then if wiped they will be quite clean; and not only will they present a better appearance, and consequently sell better, but they will probably bring a higher price.

PROJECTED SHIPMENTS.

"As I have said, I am anxious to make further shipments to England this year if I can secure space. Personally I intend to ship all the eggs from the poultry stations, which will mean from 300doz. to 350doz. per week. Mr. Heinrich, of Freeling, has promised me several thousand dozen, a working-man poultry-farmer near Kadina has promised to let me have about 600doz., and two or three other breeders have also promised to help me. I hope the delegates to this Congress when they go back to their respective districts will also decide to be personally represented in the consignments, and will use their influence in the direction of making the shipments a success. In 1895, when I was first appointed Government Lecturer, the total value of the export trade in eggs was only £27,000. Last year we sent away to the other States

something like £150,000 worth of eggs, either in the shell or in pulp. Surely an industry that brings that amount of money into the State must be worthy the consideration and help of every man who has the interest of the State at heart. We are rapidly approaching the time when there will be a closer settlement on the land, and when that time arrives poultry and the dairy cow will become of increasing importance to the producer. I want to remind you that we opened up the trade in frozen poultry with England five years ago, and the people who shipped the first year have shipped each succeeding year, and are well satisfied with the returns they have received. If the producers will help me to build up the export trade they will not only secure an unlimited market overseas, but they will keep up the local prices as well. Without the export trade prices locally are bound to come down, with the result that a good many people will lose their livelihood, and that cannot happen without it having a prejudicial effect on the whole of the community. It is said that in some parts of the country the Agricultural Bureaus forget that there are poultry-breeders in their respective districts. In this connection I feel that it is the duty of members of the Bureau to induce the poultry-breeders to become members of the Branches. I trust that delegates will seriously consider what I have said, and that the producers will endeavor to help me build up the poultry industry more than has been the case in the past." (Applause.)

THE DISCUSSION.

Mr. W. Munday (Port Pirie)—"I think the reason why farmers are not helping Mr. Laurie as he would like is because of brother fox. At one time I used to get an income of from £60 to £80 per year from poultry, and that without very hard work. Since then, however, the foxes have made their appearance, with the result that we now hardly get enough eggs for the table. Of course that difficulty can be overcome by the erection of proper yards, but it would mean considerable expenditure."

Mr. Malcolm (Kadina)—"I am inclined to think that in consequence of the success of the farmers at wheat-growing the important poultry industry has been neglected. I am convinced there is a lot of money to be made out of poultry, provided proper attention is given to the business. I sincerely hope that Mr. Laurie's address will lead to more attention being given by farmers to the poultry industry."

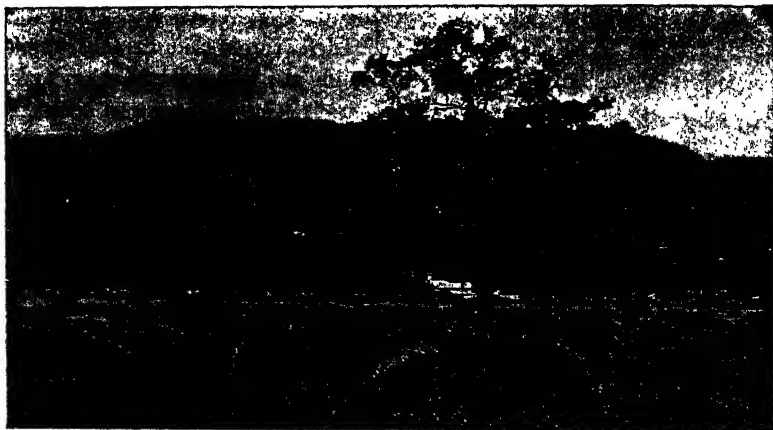
A Delegate—"There is no doubt that in times past the poultry industry was of great value to farmers, and the time will come when it will be necessary to have such a standby again. Farmers should not lose sight of the importance of the industry, and should help Mr. Laurie in the way he has asked."

Replying to questions, Mr. Laurie said that poultry yards should be from one and a half chains to two chains square, and the posts should be made of angle iron. The yards should be wire netted to a height of 6ft. 6in. with 6in. of the netting in the ground. The only way to overcome the tick pest

was by leaving no harbor for tick. The only way to protect fowls from foxes was by keeping them enclosed in proper yards. The price of eggs had risen, and he believed it would still further advance, and that they would this year bring an average of 11d. per dozen at Adelaide. He wished a law could be passed making it compulsory on everyone to market eggs in an infertile condition, because when in that state they would keep almost indefinitely. If poultry-keepers marketed only infertile eggs it would mean a saving of from £60,000 to £70,000 to the State. He expected that the first shipment of table poultry to England during the present season would take place early in January. He was quite prepared to take anything up to 20,000 chickens and ducklings. If farmers would send their eggs to the Produce Depot instead of selling them to itinerant hawkers they would benefit financially. They could get proper egg cases from the Produce Depot for 2s. 6d. each. The cases would hold 25doz., and with their use there were practically no breakages.

THE CONGRESS CLOSED.

Votes of thanks to the Chairman and to all who had addressed the delegates brought the Congress to a close.



A HARVEST FIELD.

CONFERENCE OF HILLS BRANCHES.

The Annual Conference of Hills Branches of the Agricultural Bureau took place at Cherry Gardens on Thursday, October 5th. The following members were present, representing the various Branches named :—Longwood—Messrs. W. Hughes, E. A. Glyde, W. Nicholls, E. W. Pritchard, —. Blakely, J. R. Coles, J. Nicholls; Uraidla and Summertown—H. F. Johnson, R. N. Cobble-dick; Cherry Gardens—H. Jacobs, A. R. Stone, C. and H. Lewis, C. Broad-bent, A. Jacobs, T. Jacobs, C. Ricks, G. Hicks, J. Lewis, J. Tozer, A. Broad-bent, J. Mildwaters; Clarendon—H. C. Harper, A. Harper, J. Piggott, F. A. Shiedow, A. A. Harper, J. Spencer; Morphett Vale—T. Anderson, E. E. Hunt, A. C. Pocock, H. Sprigg; Dingabaldinga—H. Allen, F. DeCaux; Meadows—G. Griggs, W. M. Bertram, and a number of visitors. There were also present Messrs. C. Willcox, G. R. Laffer, and G. G. Nicholls (secretary), representing the Advisory Board; J. F. McEachran, M.R.C.V.S. (Government Veterinary Surgeon); and W. L. Summers, (Secretary to the Minister of Agriculture).

OPENING ADDRESS.

Mr. Charles Willcox, in declaring the Conference open, said that the object of the Advisory Board of Agriculture and the Bureaus as a whole was to help men who helped themselves. In this direction the Bureau was doing splendid work, especially at conferences such as the present one. He regretted the absence of the Minister of Agriculture, because they had never before had a Minister who took such a deep interest in the work of the Bureau. In making the journey up he had been impressed with evidences in all directions of marked improvement. The gardens and fruit trees spoke volumes for the interest which was taken in fruit-growing. The difficulties besetting the fruitgrowers in this country were many and varied, owing to the climatic conditions, which lent themselves to the propagation of all sorts of pests. The fruit which was grown in Australia would bear comparison with anything to be seen in any other part of the world. They had some good men among them, who spared neither time nor trouble in improving the quality of their products. Mr. Laffer, who was present, was a real hero in that work, and he hoped he would long be spared to continue it.

PRINCIPLES OF SOIL CULTIVATION.

Mr. E. W. Pritchard (Longwood) read the following paper on this subject :—
“ At the outset I had better make myself quite clear with respect to the title of this paper. The principles of a subject are certain truths which contain in a small compass all that is known thereon. With a knowledge of the

principles the practical application follows as a matter of course. For instance, if a man knows all the principles of a steam engine he can construct an engine of any given requirements; so also the principles of agriculture are certain truths upon which practice is based. In the case of the steam engine we are dealing with things that are quite definite and well understood—physics, mathematics, and mechanics; but when we come to agriculture it is different. It is such a complicated subject, and so partially understood, that our list of principles is rather incomplete, and we have to trust somewhat to tradition for our practice. Until a few years ago agriculture was ruled almost altogether by tradition. It is only since the sciences of chemistry and physics have been applied to the solution of its problems that it has had any principles at all. Since that time they have been gradually accumulating, until at the present we have a fairly complete working list. To-day we will confine ourselves to one branch, viz., the principles of cultivation. Let us divide them up into two: first those which have to do with weathering the soil; and, secondly, those concerned with the conservation of soil moisture. Weathering is the breaking up of the soil particles into small pieces, resulting in the liberation of plant food. Cultivation aids this through the agency of friction and the admission of air and water. All stirring of the soil with implements rubs the particles together, and so knocks off corners and grinds them finer. It also breaks up clods, and so allows the next agent—air—to come into operation. The action of air is a chemical one. The gases of which it is composed combine with certain substances in the soil particles, making them soluble in water and thus available for nourishing the plant. No plant can take in its food until it is in a liquid condition. Air is necessary also to the life of the soil bacteria, which play such an important part in the conversion of humus into nitrates, which is the only form in which most plants can obtain their nitrogen. There are some species of soil bacteria which live without air, but they are inimical to the growth of cultivated plants. Water penetrates the soil much more easily when it is cultivated. Rainwater contains various gases dissolved out of the air; some, such as oxygen and carbonic acid gas, help in making the plant food soluble, while another—ammonia—is an almost direct plant food itself, and a very important source of nitrogen to the soil. Further, the water takes up substances made soluble by the air and bacteria ready to be taken in by the roots of the plants; also it washes out of the soil substances resulting from the weathering of the soil particles which are injurious to plant growth, such as salt and magnesia. Now we come to the conservation of the soil moisture. The movement of the moisture in the soil is governed by what is called capillary attraction. It is rather difficult to understand, but is sufficient for our purpose to know that when a substance is composed of fine particles water has the power of passing from one particle to another quite independently of the law of gravitation. For instance, if a piece of

loaf sugar be placed with one corner just touching a vessel of water the water will gradually creep up till it reaches the top. In the soil this movement is equal in all directions ; that is, it takes place downwards and sideways as well as upwards, and keeps on until equilibrium is reached, that is, until the soil is equally moist right through. Thus, if the surface dries up, the moisture from below comes up until the soil on the surface is just as damp as that below. Then, if a shower falls on the surface, the moisture moves down till the lower soil contains just the same amount of moisture as the surface soil. In this way moisture can be brought to the surface from a depth of over 100ft. Now, this action can only take place when the soil particles are packed closely together. If the soil is lying in small clods the action is very much hindered if not entirely stopped, for it is only just where the clods touch each other that the moisture can pass. This is the reason for keeping a mulch of loose soil over the surface of the ground in the summer time, so as to form a break in the capillary movement of the moisture, and so keep it in the firmer soil below.

"It seems to me that the conservation of soil moisture is a necessity of our dry summers which we hardly appreciate enough. In England, whence most of our old farmers come, weathering is almost the only thing considered. The English system was adopted here in the first place, and old practices die hard. It has been shown in America that with all summer crops three or four cultivations pay well. Maize and sorghum and all such crops should be grown in this way ; while if lucerne were sown in drills and the space between the rows cultivated, not only would it require less water in summer, but the land could be sown with oats and barley in the winter instead of lying idle.

"There is another point connected with capillary attraction that I wish to touch on here, namely, the firming of the subsoil. We have heard a great deal lately about an American implement called the subpacker. It is a kind of cultivator, the tines of which revolve beneath the surface and press firm the lower layers of soil. What is the principle on which it is based ? It is this : When the soil is ploughed deep the lower layers as well as the surface are broken up into small clods, and so the movement of moisture is prevented in perhaps 10in. of the surface soil. The result is that when the hot dry summer comes the whole 10in. of soil dries out, and the roots of plants have to go right down to the subsoil to get moisture ; but this 10in. of surface soil is usually the richest in plant food, but because there is not much moisture in it it is completely wasted. If, on the other hand, the lower layers of soil are pressed firm, they are brought into connection with the subsoil, and by capillary movement may attain supplies of moisture from a great depth. Then the roots of the plants can ramify in it and obtain their food all through the summer. The subpacker is used chiefly in countries with a scanty rainfall ; but it is in such places where the rainfall is as abundant as it is in these

hills that the same results can be brought about by doing all deep cultivation early in winter. Then the winter rains will set the lower layers of soil firmly together, and the surface can be cultivated shallow in the spring. This is the system now advised by the United States of America Department of Agriculture for the growing of potatoes and other crops.

"From the foregoing we may deduce the following general rules for practice :—(1) Plough deep and leave loose and rough in winter. This is to allow air and water to penetrate freely, and expose as much surface as possible, for weathering takes place chiefly in winter. Of course, the surface cannot be left rough if a crop is to be grown through the winter. A loose, smooth surface with a firm bottom is best for summer. The loose, smooth surface prevents the evaporation of moisture, and the firm bottom allows the moisture to come up to where it is needed."

Mr. Cobbledick (Uraidla) said that in his district the trouble was to get the water out of the soil in the winter. They were growing late potatoes and early swedes. The suggestions contained in the paper would be very helpful. Proper working certainly retained a great amount of moisture, even in the hottest of summers, and if the top of the soil was well worked a growth would start when there was no rain whatever.

Mr. W. L. Summers said that when he first began operations he held that it was a very good thing to plough deep early in the winter, leave the ground exposed to the weather, and then break it down fine in the spring. He found, as a result of five years' practice, that ploughing early in the winter and leaving the ground rough resulted in the surface baking and remaining in that condition until after the summer. He now made a practice of leaving the ground absolutely alone until, say, August. When ploughing and cross-ploughing were finished up by about October the ground did not then bake. The conclusion he came to was that with the strong loams and clay soils throughout the hills, where they had a rainfall of from 26in. to 36in., it was better to keep the ground covered with green stuff to prevent washing, and leave the ploughing as late as it could safely be left. At Cherry Gardens they could leave it a month later than was advisable at Coromandel Valley. The Campbell system was to plough deep while there was moisture in the ground, and to firm the subsoil so that crops might be grown during the warm weather. When ploughing was done in August in this district the land was full of moisture, and the best results would accrue if the ideas expressed in the paper were followed out. There was more to be gained out of the principles of the Campbell system in the hills in growing fodder crops in the summer and late autumn than there was in the drier districts of the State.

Mr. Chas. Willcox said a great deal depended on the soil as to the amount of packing it required. Red clay, if packed too tight, caused the water to run off instead of conserving it. The difficulty in this class of soil was to keep it open. The principle was right, but it had to be varied according to the

condition of the soil. Cultivation of the surface in summer would assist in retaining the moisture, and would encourage the growth of weeds, &c.

Mr. DeCaux (Dingabaldinga) asked what effect gravel would have on capillary action.

Mr. Pritchard replied that the movement would go on in the fine part of the gravel, but not so quickly as if the soil was composed of even matter. It was necessary to apply the principles laid down according to the conditions existing. Winter cultivation depended a great deal on the drainage. With good drainage there would be no baked condition of the soil. The water would pass through the soil into the drains. When the soil was not drained the system of cultivation had to be modified to suit the conditions.

REGISTRATION AND LICENSING OF DAIRIES.

Mr. W. H. Bertram (Meadows) read the following paper dealing with the regulations under the Food and Drugs Act respecting dairies :—" The term 'dairyman' under the present Food and Drugs Act includes every person who keeps one or more cows. The widow woman who keeps one cow is classed under the same heavy restrictions, registration, and licence fees as the person who owns the largest dairy in the State, providing she should be fortunate enough to have a pint of milk to sell to her next door neighbor, or a pound of butter to help pay her grocery account at the local store. If the large dairy-farmer sends his milk or cream to a factory instead of selling his own milk and butter, he is exempt under the present Act. I see no just reason for this distinction, considering that the products are of the same nature and are used for human consumption, only in the latter case they are put on the market through the factory or company. Most members of the Agricultural Bureau are in a position, from practical experience gained as cowkeepers, to give a straight out, unbiased opinion on this subject, more especially those of us in the Hills district, where cow-keeping is carried on in a small way. I feel sure that every member will consider that proper provision should be made to ensure the purity of milk, and that the local boards of health are the bodies in the best position to say whether dairying conditions are carried out in a satisfactory manner in their various districts. Nearly all the local boards appoint their own health inspectors, and should a person have a doubtful cow, or keep his sheds or dairying utensils in a filthy condition, there would be some person residing in that particular district who has the welfare of the public health at heart, and also courage enough to report the matter to the local inspector. Further, I have no hesitation in saying that should there be a branch of the Agricultural Bureau in the vicinity the matter would be brought to light by one of its members. The inspector receiving the report would pay the person and premises a visit, and report his investigations to the local board, and that body of men would give the matter their earnest attention. Should they fail to carry out their duty, the person who made the complaint would have the right to report

the matter to the Central Board. Cow-keeping conditions in the metropolitan districts are totally different from those of the country districts. In the city a cowkeeper would have a number of cows herded in a small yard over night, and in wet weather the place would become a quagmire, but in the country we deal in broad acres and different conditions prevail. In many cases cows are fed and milked in the paddocks. There is no necessity for a shed. It is in the State's interest to encourage the cowkeeper in the country, but the existing regulations will discourage them. The local bodies should be given full power to administer the Act in the country districts instead of the Central Board, who are not in such a good position to realise what is necessary. With respect to the registration and licence fees, which are to be 10s. each respectively per annum apart from the number of cows kept, on principle I consider this one of the most harsh and unjust regulations ever put into force. If it is absolutely necessary that some fee should be paid by the person who keeps a cow, why not have one registration fee which would hold good so long as the person registering kept a cow; the registration fee to be a nominal one. There are many families throughout the State depending almost entirely on milk-vending in a small way for a living. If the regulations, registration, and licensing fees under the Food and Drugs Act are to be enforced in country districts it will mean that only those who can afford to go in for dairying on a large scale will be able to comply with the above conditions. The dairying industry throughout the State is being seriously hampered by these regulations and fees. For years we have been trying to encourage this industry, but if the cost of production be increased and the industry left in the hands of a few, dairy produce will become a very expensive item for the consumer, and the State will suffer considerably in the export trade."

An animated discussion followed.

Mr. Jacobs (Cherry Gardens) said the regulations under the Food and Drugs Act had brought about a depreciation of 50 per cent. in the value of cows. If the regulations were to be enforced he would sell all his cows.

Mr. McEachran (Government Veterinary Surgeon) said he thought the matter had been taken too seriously. It was not the intention of the Central Board of Health to unduly harass dairymen. Sufficient time would be given owners to carry out the requirements of the regulations. If the local board neglected to carry out its duties under the Food and Drugs and Health Acts, the Central Board had the right to step in. In New South Wales no licence fee was charged, and so far as he could see there was no reason why the local Act should not be amended in this way. It was only right that decent accommodation should be provided for the milking of cows, if only from the standpoint of the cows themselves. Further, it was hardly right to expect the womenfolk to go into a dirty yard with no covering and milk cows under such conditions.

Mr. Laffer (Advisory Board) said the object in passing the measure was to secure supervision, but he could not see why the dairyman should have to pay £1 for the privilege of selling the milk from one cow. It was unreasonable that any fee at all should be charged. The present regulations resulted in numbers of cowkeepers selling milk on the sly, and thus coming into unfair competition with those who paid the fee and carried out the requirements of the regulations.

Mr. Nicholls (Longwood) said the local boards had had the opportunity of supervising the dairies, but had neglected to do so. Under the circumstances there appeared to be no option but that the Central Board should administer the Act. There was not a single district in the State where supervision was not necessary.

Mr. F. DeCaux (Dingabaldinga) had seen people milk cows with their teats festering with cow poek. It was absolutely essential to have supervision, but the requirements of the regulations under notice were too drastic and the fees excessive.

Mr. Hughes (Longwood) said he was entirely against inspection. Dairy-men would be clean because cleanliness paid. He did not think there was as much disease in milk as was generally supposed.

Mr. McEachran (Government Veterinary Surgeon) said milk might be contaminated through the cow being diseased, or through being brought into contact with dirty utensils, dirty udders, and dirty hands of milkers. To ameliorate these conditions the health authorities had passed certain regulations requiring the provision of an impervious floor in the cowshed, proper drainage, &c., with which they expected dairymen to comply for the protection of the consumers.

Mr. Smith thought the fees too high. Perhaps it could be arranged that if the inspector found the dairy and cowsheds in proper order the fees paid for the licence could be returned.

On the motion of Mr. Bertram the following resolution was carried :—" That this Conference, while agreeing that some supervision in regard to sanitary requirements is necessary in the dairy industry, considers the charges made for annual registration and licences should be reduced, and that after the first registration no further fees should be charged for annual registration and licensing."

Afternoon Session.

VETERINARY LECTURE.

A horse having been provided for demonstration purposes, the Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) delivered a lecture. After describing the various hereditary unsoundnesses affecting horse stock, and impressing upon his audience the necessity for abstaining from breeding

from sires and dams affected, he then proceeded to deal with first aid methods, etc., in treating common ailments, as follows :—

“A critical examination of the feet of horses may reveal conditions such as quittor, thrush, canker, corns, and sanderack. Quittor was defined as a sinus of the coronet, or where there is one or more suppurating points at the coronet. In Australia it is commonly caused through bruises, pricks whilst shoeing, or the result of a picked up nail, or a neglected corn.

Bruises of the coronet should be fomented and dressed with cooling lotions, *e.g.*, acetate of lead solution. Blacksmiths should always keep antiseptics in their shoeing sheds, so that wounds due to pricks whilst shoeing, or picked up nails can be properly attended to.

Thrush and canker are mainly caused through neglect and insanitary conditions. With thrush there is an unhealthy discharge from the cleft of the frog, and in canker a diseased condition of the deep tissues of the foot, with abundant discharges, fetid odor, and the rotting away of frog and sole.”

The lecturer then strongly condemned the manner in which much of the horse stock of the State was stabled and yarded.

For thrush he recommended cleansing and the application of calomel ; and for canker a 5 per cent. solution of formalin.

In connection with sore shoulders, the careful chambering and attention to collars was most important. The shoulders of horses liable to sore shoulders should be bathed with cold water at the conclusion of the day's work, and afterwards dressed with an astringent lotion, *e.g.*, sulphate of zinc and sugar of lead, 1oz. each ; water, 1qt.

Fistulous withers or sinus of the wither was chiefly accounted for in Australia by horses receiving injuries to the wither through rolling in stony and stumpy country, or by passing through heavily timbered country ; it may also be produced from badly fitting collars and saddles. Taken in the early stages, the treatment by fomentations and embrocations and mild blisters was often efficacious, but in cases of this description it was advisable to call in the services of a duly qualified veterinary surgeon.

The various kinds of wounds, *e.g.*, clean cut or incised, torn or lacerated, bruised or contused, and punctured wounds were described. After thoroughly cleansing, incised wounds should have the edges accurately brought together and sutured, the different methods of suturing being illustrated.

In torn wounds the blood-vessels should be caught and tied and the wound carefully sutured, good drainage being allowed. Antiseptic dressings, *e.g.*, lysol and carbolic lotions, were advised.

The presence of the germs of tetanus, or lockjaw, in and around manure-laden stables and yards demonstrated the necessity for attending to all wounds in animals. The germs of lockjaw gained entrance to unprotected wounds, and more especially punctured wounds. The cleansing and dressing of wounds with antiseptics was therefore of immediate importance.

The isolation of mangy horses, the dressing of the skin trouble with sulphur, tar, and oil, and the treatment of ringworm with iodine preparations were dealt with, after which the lecturer advised owners respecting the treatment of horses with strangles and influenza, recommending early isolation and attention, feeding on greenfeed and bran mash, administration of cooling medicines, *e.g.*, saltpetre and hyposulphite of soda (dessertspoonful doses three times daily in drinking water) and thorough cleansing and disinfection of premises.

Founder, or laminitis, was described, and owners were advised to remove the horse's shoes, place the feet in cold bran poultices, a puddle of clay, or in a running creek, and give a dose of laxative medicine and cooling diet.

At the conclusion of the lecture a number of questions were put and satisfactorily answered.

CO-OPERATION AMONG FRUITGROWERS.

Mr. Allen (Dingabaldinga) read the following paper on this subject:—
“All the fruitgrowers in the southern districts should co-operate and establish a centre at some place where all the fruits could be dealt with. We know that along the slopes of the Mount Lofty Ranges fruit is nearly of one quality as regards the saccharine in it. I do not mean to say it is all one quality, as some people who have orchards are so indolent that their orchards are a breeding ground for all the pests against which we are trying to fight. This is where a co-operative body would be able to control. I would like to see a suitable place built where all persons could take their fruit, and in the case of fruit for export purpose, *e.g.*, apples, pears, &c., have them properly graded and classed as first, second, third quality, then packed in uniform cases, shipped direct and sold in the best market. By having one centre we could place large quantities of one grade of different fruits. As things are now one man may have only 100 cases of, say, Jonathan apples; by co-operating 1,000 or 2,000, or even more, of one fruit could be sent uniformly graded. By sending our fruit in this way we should do away with the middleman and get cheaper freights. We should have the shipping companies and the buyers of fruit coming to us. At present we are entirely at their mercy to give us what space and conditions they think fit. Not only would I advise this co-operative body to deal with all the best fruits, but the surplus fruit must be dealt with. A large evaporator for drying fruit that is not of the quality required for shipping would be required. Soft fruits could be made into jam or canned, and prunes, apples, apricots, peaches, &c., could be profitably dried, and all being of uniform quality a ready market would be found. By doing this we should also keep the money in the district and employ labor. Inquiries have been made from Germany about the rinds and cores of apples for cheap jams. Well, this should not be made into jams; it could be compressed and used as fodder for pigs and cattle by adding molasses or linseed.

The apples themselves could be evaporated, canned, or made into cider or vinegar. Victoria has a large cider factory, and is sending to Adelaide cider of the first quality. Why should we not make our own? It could be done by co-operating, and would keep a staff of men permanently employed. I feel sure if we approached the Government they would be willing to subsidise the industry."

In reply to a question as to whether the skins, cores, &c., were to be dried and then compressed with the molasses mixed in, Mr. Allen said he would steam them at a high pressure and press them into a solid fodder.

Mr. Laffier (Advisory Board) said if the fruits of the State were to attain the position which they deserved it was going to be by co-operation amongst growers. Central packing places were necessary. Small growers would then provide their small quantities, and the whole lot would be graded uniformly. The buyers wanted large parcels to handle, and consequently were prepared to pay better prices for large, evenly-graded consignments. He advised the fruitgrowers to join the Fruitgrowers and Market Gardeners' Association for their own benefit. The association had made arrangements with the Government Produce Depôt, under the terms of which it could secure manure for members at a discount of 5s. per ton. The shipping companies at present were not giving the growers a fair deal. A very large percentage of the fruit which was shipped during the last season had not the slightest chance of reaching its destination in good order. One great disadvantage was the fact that the shipping agents were also produce agents.

MOTOR POWER FOR THE CONVEYANCE OF PRODUCE.

The following paper was read by Mr. Johnson, of Uraidla Branch:—"Motor power is fast proving itself to be the best, and in the near future will be the cheapest means of conveying our produce to the market. Ten years ago people ridiculed the idea of motor cars climbing our hills. The motors at present have drawbacks, but by the time they are within reach of the gardener they will be improved to suit his purposes and roads. Motors will take the place of teams in a way similar to that in which the oil engine took the place of the horseworks and chain pumps. One great thing to be said in favor of the motor trolley is that it does not cost anything to feed when not working. It costs a man with a team of, say, five horses, from £2 10s. to £3 a week for feed whether they are working or not. A motor trolley could be run to the market, a distance of 12 or 14 miles, for about 3s. 6d. or 4s. a trip, so it would cost about the same to run a car for a week as it would to keep one horse. The cost of feeding four or five horses for a year would be from £100 to £125 against about £11 for petrol. The initial cost of the motor trolley is a big outlay, but is only about twice as much as the cost of a team of four or five good horses. We have teams working on the Greenhill Road worth about £300. As for the wear and tear, the motor does not cost a great deal

more than horse teams. Nothing depreciates more in value than a team of horses. One of the biggest drawbacks to the motor trolley is the cost of the tires. They cost, for a large trolley, from £18 to £20 a tire, but this difficulty will soon be overcome; they will soon be running with iron tires at a speed of from eight to 10 miles an hour. These are as good as the rubber. A fruit or vegetable grower could not do without horses for his ploughing; but if our country still continues to prosper the gardener will find that he will very soon have to pay his market man by the hour instead of by the day. Very few market men can go to market and back, a distance of from 12 to 14 miles, in less than 15 or 16 hours. With horses it takes three hours to go to market and four to come home. With a motor trolley the two trips could be done in two and a half or three hours as against seven with horses. It costs 3s. 6d. a trip more for horses, now that the health authorities have had them removed from the market overnight."

Mr. C. Willcox (Advisory Board) said motor carriage was very expensive. The horse was more to be relied upon than the motor trolley.

Mr. McEachran (Government Veterinary Surgeon) said there was a great deal of waste in the feeding of horses as practised in South Australia. Large quantities of feed were put into the feed boxes, and the horses were allowed to feed *ad lib*. It was to be hoped that steps would shortly be taken to ascertain by experiments the most economical ration for feeding working horses. At present motor traction was not economical.

Mr. Nicholls (Secretary Advisory Board) said Mr. Duncan, of the firm of Messrs. Duncan & Fraser, estimated the cost of running a motor lorry at 6d. per mile on the city and suburban roads. Rather more would have to be allowed for the extra wear and tear of the hills roads.

THE HEALTH OF THE SOIL.

Mr. H. Sprigg (Morphett Vale) dealt with this subject in a paper as follows:—"You are all acquainted with the usual tillage of the soil and seeding operations, and according to how it responds to this treatment you praise or blame, bless or curse it—seldom yourselves. Charles Dickens said, more than half a century ago, 'That the field it would best pay the farmer to cultivate was his brain.' That is the field that our Agricultural Bureau and this Conference are cultivating, and, I think, with success. I have a few mental fertilisers in the shape of some facts that may enable us to better understand the behavior of the soil we till, and from which all living things derive their sustenance. The authorities to whom I am principally indebted for the data submitted are Howell, 'Soil Problems in Wheat-growing,' dealing entirely with Victorian soils; Buskett, on 'Soils,' and Harling. Agricultural soils may, from the farmers' point of view, be divided into three main classes—sands, clays, and loams—the sands being the coarsest, the clays the finest, and the loams intermediate. To be fertile they must, of course, contain humus, lime, and the necessary plant foods. In the physical

conformation of all productive soils there are four materials—sand, silt, clay, and humus, or organic matter, in varying proportions, and the preponderance of one of them marks the type of the soil. The size of the soil particles and their mechanical arrangement have a great influence on the warmth, moisture, air circulation, and productivity of the soil, and have as much effect on fertility as chemical composition. Soils of a sandy nature maintain 5 per cent. to 7 per cent. less moisture than clays, the soil grains are larger, the water resistance small, they dry out quickly after rain, become warm, and maturity of the crop is hastened. Clay and silt soils maintain from 18 per cent. to 20 per cent. of water, are of a colder nature, and are less active in maturing their crops, but have a more vigorous leaf growth.

“ Now, to be productive soils must also contain all the elements of plant food—12 in all ; but only four of these are likely to be lacking. These are phosphoric acid, potash, nitrogen, and lime. They are the essential quartette ; when any one of them is missing, bad results follow. I do not intend to deal with the chemical aspect of plant food, but with the condition of the soil necessary for plant food to become readily available. A soil may have all the necessary plant food and still be unproductive. To be productive it must be alive, not dead ; it must be teeming with bacteria. It is said that if you take a handful of good soil and roast it, you will destroy a population greater than the whole of humanity. On this question Howell said fertility was no longer a question depending simply on chemical considerations, or on mechanical considerations, or on a combination of both, but involved also consideration of the bacterial life of the soil and the conditions favoring their activity. This of late has found expression in the statement that the whole question of soil fertility resolves itself into the problem of looking after the welfare of the soil bacteria.

“ Now, is this possible, is it practicable, for us ? I venture to say that to a great extent it is. Let us examine the conditions of the soil necessary for the welfare of the bacteria. They are a free circulation of air, a sufficiency of moisture, phosphoric acid, humus, and carbonate of lime. The conditions that are inimical to soil bacteria are a cold, water-saturated soil, preventing the free circulation of the air, and a sour or acid state. Now the two first requirements—circulation of the air and moisture conditions—can be maintained by proper tillage and cultivation ; but whether you can bring to and retain your soil in a proper mechanical condition, will in a great measure depend on whether it contains a sufficiency of humus and carbonate of lime. The phosphoric acid necessary can be supplied by the ordinary superphosphate, and a benefit is derived from it other than its available plant food. A soil well charged with humus will be free tilling, well aerated, highly retentive of moisture, with a plentiful supply of nitrogen. Hard silting clay soils and light sand soils are usually deficient of humus. A soil well supplied with carbonate of lime will have free tilling properties ; nitrification will be active—that is, the conversion of the humus nitrogen into an available form.

Without the carbonate of lime with which to combine, the acids formed by the decay of vegetable or organic matter accumulate in the soil and lead to sour conditions. When it is recognised that the difficulty in working many of our soils, and the labor required to bring them to a good seed bed, which in many cases is only possible under favorable weather conditions, is mainly due to the lack of humus and lime, the necessity of keeping these supplied must be appreciated. The best material for the supply of humus is stable manure, the next green manuring, but neither of these methods can be used on a large scale by the average farmer. The simplest method is perhaps to introduce a grass or green crop rotation, and feed off with sheep. The grazing method of maintaining the humus supply is not only the simplest but also, by the production of lambs for export, may be made a highly remunerative one. When and which of our ordinary farm soils require humus is a question that may in my estimation be simply answered by 'all' and 'always.' When to apply lime is not so easy to answer, but generally when any land left under grass for a year or so is sour and grows mosses and lichens, or when it is tough and tenacious to work, and when it sets like a brick after rain, you can be sure it requires lime. A simple test of sourness is to get some wet soil, squeeze it together, make a hole in it with a knife blade, but a strip of blue litmus paper in the opening, and press the soil firmly around it. If the soil has an acid reaction the blue litmus paper will be turned to a red color. Experiments have shown that ground limestone of good quality is just as effective as burnt lime when equal quantities of calcium oxide, that is burnt lime, are used in each case. This means that 100lbs. of ground limestone takes the place of 56lbs. of burnt lime. Liming the soil is a very ancient practice, and dates back to Greek and Roman days; but with the advent of chemical fertilisers about 50 years ago there seems to have arisen a feeling that they would take its place; but now it is being recognised that not only do they not take its place, but that having an acid reaction they make its use more imperative. Any system of farming that neglects the maintenance of the humus and lime of the soil is only living on capital, that is, the original fertility of the soil, which must in time be depleted. The true objective should be to ensure an increasing fertility. The old method of applying lime was in heavy dressings of 10 to 25 tons per acre at long intervals of 10 to 15 years. The method most approved of late years is a light dressing—from a few hundredweights to a ton per acre—applied once in the course of a three to five years' rotation, the lime being applied with a lime spreader or an ordinary drill. Another essential factor in maintaining the health or fertility of the soil is rotation of crops. Continuous cereal-growing, even under the bare fallow system, will ultimately result in cereal sickness. Some producers in this district may have had the experience of growing peas on land that has yielded disappointing returns of cereals, and have probably been surprised at the results. There has been no apparent lack of fertility in the case of the peas. Quite the reverse, in fact,

"On this subject an American authority says—'In general agriculture, whether in grain-growing or ordinary live stock farming, the growing of legumes is absolutely essential as part of any economic which shall maintain the fertility of the soil.' When a sufficiency of lime is in the soil it is possible that with a two years' grass rotation the clover and trefoil growth may be sufficient; but a cultivated legume crop would be better. I do not wish any of my remarks to be taken as in any way antagonistic to chemical fertilisers or their use, rather as supplementary to their use; but their use in soils that are not in good physical health cannot give the returns we have a right to expect. It is only a form of miracle farming, and you know the miracle is a shy plant, and does not bloom every time and all the time. It is the average return we are after, the dollars per acre, and with our rainfall south of Adelaide our average should be better."

Mr. W. L. Summers said the grass lands in the South were deficient in lime and salt. Sorrel and other sour land plants were practically choking out the best of the grasses. Most of the soils throughout the southern areas would benefit from applications of lime.

FREE PARLIAMENT.

USE OF FERTILISER BAGS FOR FODDER.

This subject was introduced by Mr. J. Spencer (Clarendon), who said there was a great danger of anthrax from second-hand fertiliser bags. He quoted a case recently noted in Victoria, and asked the Conference to recommend the Advisory Board to take the matter up and endeavor to secure the passage of legislation prohibiting the use of manure bags for produce of any kind.

Mr. McEachran (Government Veterinary Surgeon) said anthrax had been introduced into New Zealand through the agency of contaminated bonedust. After a long discussion, the following resolution was carried:—"That, this Conference expresses the opinion that Parliament should prohibit second-hand fertiliser bags being used for chaff and other food produce."

FARMERS' DAY AT ROSEWORTHY.

Mr. Harper (Clarendon) suggested that the Government should be asked to set aside a day for a visit of southern district farmers to the Agricultural College at Roseworthy. The Secretary Advisory Board suggested that it would probably be more satisfactory for individual Branches to arrange with the Principal of the College for a visit on a convenient date. Excursion fares could be obtained by members who secured their certificates from him.

NEXT CONFERENCE.

Invitations were received to hold the next Conference at Meadows, Uraidla, Clarendon, and Longwood. It was decided to accept the invitation to go to Meadows,

CONFERENCE OF NORTHERN YORKE'S PENINSULA BRANCHES.

A Conference of Branches of the Agricultural Bureau, situated in the northern part of Yorke's Peninsula, was held in the Town Hall, Kadina, on Thursday, October 12th.

The following delegates were present at the morning session representing the undermentioned Branches :—Messrs. T. Laidlaw, Moonta ; J. Malcolm, A. L. Speir, R. Correll, J. N. Pedlar, G. A. Weidenbach, A. G. Patersen, R. J. Rice, J. H. Southwood, D. W. Martin, Kadina ; W. R. Stephenson, J. Westbrook, W. Short, H. Klein, A. G. Lamshed, A. Elix, Arthurton ; G. Inkster, S. T. Barr, D. Carman, C. Schultz, W. H. Johns, Pine Forest ; J. P. Pontifex, T. H. Price, A. Goodall, H. F. Koch, Paskeville ; E. Fisher, J. H. Traeger, Balaklava ; W. H. Sharman, J. H. Barnes, H. Schroeder, Bute.

SOIL MOISTURE.

Mr. W. R. Stephenson (Arthurton) read a paper on this subject, for which see page 317 of the October issue of the *Journal*.

CHEMICAL FERTILISERS.

This subject was dealt with in a paper by Mr. Jas. McCulloch (Manager of the Phosphate Company, Wallaroo). Having spoken of the discoveries of Liebig and the experimental work of Lawes and Gilbert, the writer referred to the many swindles which had been worked off on to the credulous farmers some years ago, and the paper then continued—"Had not dissolved bones quickly competed with the earlier guanos (whose value as fertilisers consists in the nitrogen and potash as well as the phosphate which they contain) the price of guano must have risen tremendously, and had not mineral phosphate risen to the relief of bones the price of the latter must have become prohibitive.

"The world's consumption of phosphate rock is now estimated to be approximately over 5,000,000 tons annually, and the rapid growth of the fertiliser industry is to be attributed to the discovery of enormous deposits of mineral rock in all parts of the world. Had these enormous supplies of phosphate rock not been found, the industry must of necessity have been stifled in its infancy from a lack of a sufficient supply of raw material. The three main elements of plant nutrition, which are usually somewhat deficient, are nitrogen, potash, and phosphoric acid, and the most important of these in the vast continent of Australia is phosphoric acid. All three, however, are needed in available form for successful crop production. An excess of

one element in the soil does not compensate for the deficiency of another, and they must all be present to perform or assist in performing the various functions which are ever active in the growing plant. Virgin soils usually contain a liberal supply of these plant foods. This stock is gradually used up in the growing crops, and the soil becomes impoverished, necessitating the addition of fertilisers containing the ingredients which, in the soil, are deficient. Investigations made on Australian soils show that in the vast majority of cases they are singularly deficient in phosphoric acid contents, but have large natural potash contents, and that nitrogen is relatively abundant. It has been calculated that every ton of wheat grown removes from the soil 11lb. of potash, 15lbs. phosphoric acid, and 45lbs. nitrogen. The wheat-growing districts of this State have the simplest and cheapest manure problem of any country in the world. In all other countries the addition of mixed fertilisers to the soil is found to be absolutely essential, whereas amongst Australian farmers artificial manures are practically summed up in the one word 'super.' It has been shown by careful experiment and investigation that the soil is a kind of manufactory in which nitrification is continually taking place through the propagation of certain organisms, and that by the agency of these bacteria the nitrogen is converted into a form in which it can be assimilated by the plant. In Europe and America this bacterial formation of nitrogen in the soil requires to be supplemented by a nitrogenous dressing of fertiliser, either in the form of sulphate of ammonia or nitrate of soda, in order to secure the maximum growth of wheat per acre. In Australia, however, these supplementary dressings are not applied, as it is considered that there is a sufficiency of available nitrogen in the soil. Potash is being extracted from the soil by each crop that is grown thereon, and as it is not being replenished by the addition of mixed fertilisers or by any chemical changes in the soil, it seems that the potash is undergoing a gradual process of exhaustion from the soil. Whether the agricultural soils contain a sufficiency of nitrogen and potash can only be determined by experiment and from the practical experience of the farmer who has practical knowledge of the condition and requirements of his land. It is quite possible that while many of the soils throughout the State contain a large natural supply of potash and nitrogen, and only require a supply of phosphoric acid to raise the fertility to the maximum standard, other soils may be improved by the addition of a mixed fertiliser containing one or both of the former ingredients in addition to the latter. In order to get some reliable information on the subject, and data that may be of value to the agricultural community, the Wallaroo Phosphate Company have given to various farmers in this and other districts a couple of bags of a special mixed fertiliser containing the three fertilising ingredients in suitable proportions. Plots of three or four acres have been pegged off and treated with the special wheat fertiliser. These will be harvested separately and the results compared

with adjoining plots manured with a similar quantity of ordinary standard super. One of the best preventives of disease, both in the animal and vegetable kingdom, is to supply plenty of nutritious food. In the animal kingdom if the body is scantily nourished it becomes emaciated and diseased; the doctor will order a change of scene, prescribe a tonic, and recommend an abundance of nourishing food for the patient. It is exactly the same thing with a soil when it becomes impoverished—it needs a change which may be supplied by lying fallow or by a suitable crop rotation. The necessary fertiliser ingredients also require to be liberally supplied for the proper growth and healthy development of the plant. It is false economy to starve the crop for the sake of a few extra pounds of fertiliser per acre. If sufficient manure has not been drilled in the farmer fails to make the best and most profitable use of his land; and if an excess of super. be added, it is not lost, as it remains stored in the soil and enriches it for the benefit of future crops. The question of using mineral phosphate rock as a fertiliser crops up spasmodically like the measles or some other affliction. Sometimes its advocate is one whose intentions are good but whose chemical and scientific knowledge is like the x sign in algebra, an unknown quantity, or perhaps it may be fathered by an individual who is imbued with the penny wise and pound foolish principles. Its most earnest supporter, however, is generally someone whose motive is not above suspicion, and who is either directly or indirectly interested in some low grade phosphate deposit. In any case, the efforts to promote the sale of raw rock phosphate in the light of worldwide experience, and the failure to show any appreciable fertilising effects can only be classed as a very serious deception and misleading to the farmers. The Association of German Agricultural Experiment Stations, which is universally regarded as the world's highest authority on such matters, have stated that mineral phosphate rock is useless as a fertiliser, and that its use should be discouraged. The report states that from experiments made it can be concluded with certainty that the general use of earthy phosphates (raw rock phosphate) cannot be considered as phosphoric acid fertilisation. In England the use of phosphate rock has proved equally unsatisfactory, and the question has been decided long ago and most emphatically in favor of superphosphate. Within the last decade experiments extending over a number of years have been conducted in various States throughout America with the raw rock and with equally unsatisfactory results. The fact that wherever the natural mineral rock has been tried its use has been abandoned after a short trial shows its worthlessness when used in this State. The constituent to which natural phosphate rocks owe their value is tricalcic phosphate, which is an insoluble form of phosphate, and is absolutely worthless as a fertiliser. Science has revealed that sulphuric acid, which is a much stronger acid than phosphoric acid, can be used to break up this combination, and combining with the lime itself to form gypsum, renders the phosphoric acid free and available. The

mineral phosphate rock, therefore, requires treatment with sulphuric acid, and subsequent preparation of the material to render it of value to the farmer. The resultant soluble phosphate is readily diffused in the soil, and is the most valuable form of phosphate for plant life. The demands for artificial fertilisers continue to increase by leaps and bounds year by year. The amount of superphosphate manufactured throughout the world for last year was over 9,000,000 tons, but the consumption of all classes of fertilisers, including super., was considerably in excess of that quantity. It will, perhaps, give some conception of the magnitude of this industry and the enormous amount of fertilisers that are being used when we state that the United States of America, which is the largest fertiliser producing country of the world, made 7,000,000 tons of fertilisers last year. It is estimated that the production there is increasing at the rate of 10 per cent. per annum, so that the consumption in America alone, at the end of the next decade, will be over 14,000,000 tons. The consumption of super. which is increasing rapidly year by year in the various States throughout the whole of Australia, was, approximately speaking, 250,000 tons for last season. South Australia took about 91,500 tons of this quantity, and there would probably be about 4,000 tons to 5,000 tons of mixed manures used in addition."

A number of questions regarding manurial problems were put to and courteously answered by Mr. McCulloch.

Afternoon.

Mr. Goodall took the chair and welcomed Messrs. W. Lowrie, M.A., B.Sc, F. E. Place, M.R.C.V.S., and G. G. Nicholls (Secretary Advisory Board). He was sure the farmers would all agree that the Government had done the best thing possible for South Australian agriculture in again securing the services of Professor Lowrie as Director, and he hoped he would remain in that position for many years. There was a great deal to be gained by Conferences such as these, and everyone who attended should add something to his store of knowledge.

PREVENTION OF STOCK DISEASES.

Mr. Place, in introducing the subject of stock complaints, said he would confine his remarks to the prevention of diseases, and deal with the subject on general lines. Until the cause of any disease was discovered it was not possible for the scientific man to do very much in the way of prevention. When the cause became known, it was usually a comparatively easy matter to guard against the complaint. Most books dealing with the diseases of stock devoted about nine-tenths of the volume to instructions regarding the administration of drugs. The other tenth explained the anatomy and physiology of the animals. If the ratio were reversed farmers would be very much more in pocket, because when diseases were well developed their cure had to a

considerable extent to be left to nature. Farmers should be able to distinguish clearly between early and advanced stages of disease. This could only be done by understanding the anatomy of stock. Injudicious feeding was the cause of a great number of the more common complaints. Under usual circumstances the horse could eat chaff in good quantities, but if conditions arose under which it is not possible for him to properly assimilate his food, and he went off in condition, the feeding of large quantities would only aggravate the trouble. The same applied to other animals. It must be remembered that germs were lying in countless thousands all over the place; but they were harmless unless they met with proper conditions to render their growth satisfactory to themselves. If attention was paid to the ordinary wellbeing of animals no trouble was to be feared from germs. In all cases of disease the early symptoms were easily recognisable by the man who had lived amongst the stock. If he knew the animal he would know by the way it walked, or from its breathing, when anything was wrong. Proper attention in the early stages would give better results than any amount of administration of drugs and drenches later. If a horse was not drawing its breath properly it might not mean anything, or it might mean trouble was brewing. However, it was an intimation that it was time to let nature have a chance to build him up. Some of the stock diseases in South Australia arose from the forage, some from the climatic conditions, and others seemed inherent in the animals themselves. Many diseases arose through food and water being given in wrong quantities or at wrong times and in wrong ways. For instance, with stoppage of the wind the trouble was that the food had fermented and expanded the stomach, with the result that it pressed on the heart in bad cases and caused the animal to expire. When horses were given water on top of a big feed of chaff, the effect was to wash a large quantity of chaff into the water gut, where it got no chance of being digested, and was likely to cause trouble. When horses were turned out after heavy work, and exposed to the weather, it was quite possible that traces of disease which were lurking in the animals would be given a chance to develop, and serious trouble would result. With reference to such diseases as colic, 99 per cent. of them were preventable by studying the habits of the horses, and noticing promptly any alteration therein. Nature provided the animals with teeth of such shape as would best enable them to properly masticate their food. If teeth were filed, it was more than likely that the animals would not be able to chew its food properly, and trouble and waste of food resulted. About 90 per cent. of the horses in South Australia had blood worms, and their presence in the intestines of the horse would do no harm unless conditions favorable to their development and multiplication were brought about. When a horse was suffering with blood worms, it was usually possible to find the worms or eggs in the dung with the naked eye or a magnifying glass. The bot-fly was an insidious pest which glued thousands of eggs under the chin or

on the hair at the back of the legs of the horse. The horse attempted to remove the irritation with his tongue, and the eggs were transferred to the stomach of the animal, where they developed. The early symptoms of founder were to be detected by the horse going a bit off color and then becoming stiff in the front legs. If the animal was worked the stiffness would probably work off by the evening, but it would be worse afterwards, and in the course of a few days serious symptoms would arise. Instead of stocking up a medicine chest with drugs, more good would be done by carefully taking note of the circumstances which accompanied any outbreak of disease. Horses were naturally clean livers and clean breathers. When they were put into unsatisfactory yards they did not get a fair chance. Nothing was more common in South Australia than to see horses working amongst healthy surroundings during the day, only to be put into a foul stable to spend the night. Cleanliness in the housing of animals was essential to their health. Skin parasites which attacked the horse could be treated by first subjecting the animal to a thorough scrubbing with soft soap, after which the skin should be well oiled. With dry bible in the majority of cases the mischief had begun weeks before the animal was brought under treatment. If it had access to salt licks and bonemeal there was little likelihood of trouble.

At the conclusion of his remarks the speaker replied to a number of questions regarding the treatment of specific disorders with evident satisfaction to his hearers.

Evening.

CULTIVATION OF WHEAT.

Professor Lowrie, in addressing the meeting on this subject, said—

"I selected as my subject to-night the 'Cultivation of Wheat,' not in the thought that I would discuss the whole range of the practice of wheat-growing, but rather with a view to taking up some salient features in the principles that I think at the present time demand a good deal of consideration on the part of the farmer. South Australia has been thriving in a wonderful degree under general prosperous conditions, provoked to a large extent by a succession of good seasons, and it is sometimes well to sit back and think that these seasons may or may not continue. It is well to look at what is the ultimate result of the practices of wheat-growing as they have been carried on within the last few years. It will be well to discuss whether the same opportunities are to continue, or whether the same earnings are to be recovered at a relatively low cost, or whether certain modifications in our practices will be required as time goes on. I myself think that in certain items of our practices there will, I know not when, how soon, or how long, require to be made certain modifications, and I think it well for farmers now persistently to feel the pulse of

the land to see whether the necessity for these modifications is approaching. You know that within the last 20 years the practice of fallowing—making fallowing the basis of wheat-growing—has been extending until it is now universal. But even now, judging from the practice, I doubt whether the majority of the men who are adopting it fully appreciate the position. They recognise that fallowing is the best practical means on our average wheat-growing areas of producing good results, but there is apparently some want of definite knowledge of the reason; otherwise I think the practice generally would be much more uniform than it is now. You will find men here and there who are thoroughly alive to the importance of early fallowing, and you will find men who are even now only finishing. These men who persistently delay their fallowing for the sake of getting a bit of extra feed, are forgetting that within a few years they will bring about a condition of things that the land will not respond to phosphatic manures, and will not yield the crops they are getting now. That is, for the simple reason that the practice of delaying fallowing is also a means of lessening the supply of nitrogen, and it is a fact that cereals require a supply of nitrogen in the land as much as or more than they do phosphates. There is a feeling abroad that phosphate is the Alpha and Omega of manuring. It nearly is, if the farmers take the means of keeping up the supply of nitrogen. It is really an old story that the fertilising elements likely to become deficient are nitrogen, phosphoric acid, and potash. In the great bulk of our Australian soils the potash is in a relatively large quantity, and it will take a long period of cropping to exhaust the supply on our average land. There are certain light lands, though, that the farmer would be well advised to try over now and again a few acres dressed with sulphate of potash to see whether the degree of exhaustion has reached that extent that the land is going to benefit by the direct dressings applied. The question of maintaining the fertility by keeping up the supply of phosphates and nitrogen is, I think, by no means so intelligently looked at as it should be. The fallowing is a means of making the one season's moisture extend and help the next. That in itself, on a limited rainfall, is a valuable result, but the special benefit is that the best results are obtained by the retention of the moisture during the summer season when the weather is warm. That is a means of increasing the nitrogen supply. You have been going on for years and the only enriching your land in phosphates, and even then only putting back a portion of what your crop has taken out. If fallowing is done thoroughly it is making more of the latent phosphates in the land become available. They are being brought from a deeper position in the land and are a means of giving a supply to keep the crops as good as they ever were. This will not continue. If it were only a matter of a phosphate dressing you could increase the quantity, but there are factors we must keep an eye on, namely, the nitrogen element and the fertility. The hypothesis I am putting forward is not proved, but it seems as though there is no other explanation of the fact

that Australian farmers generally can keep on for a long succession of years growing wheat as a main crop and yet not use the nitrogen manure. That arises in this way. There are in the land myriads of ferments. In a cubic inch, for example, bacteriologists will tell you that there are tens of thousands, microscopic and almost beyond the microscope in size. These have various functions in the land. The function of a number of the ferments is, it would appear, to take the nitrogen out of the air, and by oxidising it fix in the land nitric acid, to form a nitrate in the basis of the soil. These ferments, bacteriological science is showing from year to year, and ever bringing nearer and nearer to absolute confirmation, if there be a supply of organic matter from which they can get their energy, fix the nitrogen in the air directly and enrich the soil. That is the only explanation I can offer of the fact that you are cropping year after year without added nitrogen.

"There is another series and ferments that live in association—a kind of parasitism—with the leguminosæ. You are not growing leguminous crops to get that accession of nitrogen in the land as you should. The means of getting this is by encouraging the growth of clovers and trefoils. I do not think the gain of nitrogen from bacterial fixation in itself will be enough to keep growing for a long succession of years the maximum crop the rainfall will allow. You have then to take a means of encouraging natural clover and trefoils, if you are working in an area where it will not pay you to have a leguminous crop such as peas. I advise you to change a crop a little. If you admit that there is that fermenting activity in the soil, can you understand a man fallowing in the month of September? It will appear to any man that fallowing as the summer is setting in is just the best means of ensuring that the land will be dry. The air is getting to the bottom of the furrows. What happens? The ferment life which should have been at its great activity is dormant. This is a form of plant life that cannot live without moisture. What you have to look out for is to have a sufficiency of moisture to allow the ferments greater activity. This is the gain from very early fallowing, more, I think, than the amount of moisture carried on for the following crop. Ferment life is most active at a temperature of from 85 to 95 deg. We have very nearly got that temperature in South Australia in the soil, but the man who fallows late, although he has got the temperature, has not got the moisture he requires. Heat, moisture, and air are required. You have seen in wetter years your wheat growing yellow towards the end of winter, and the farmer says the frost has been troublesome, or there has been too much wet. The trouble is that the wheat has lost its color partly through the occlusion of the land from the excessive moisture in it, and partly because the ferments were dormant. The heavier rainfall had also taken out the nitrates that were there. The purpose of early fallowing is to give the opportunity by having moisture enough in the fallow for ferment life to be in the full blaze of activity at the time of the year

when the temperature is optimum. Many men have found out from experience, and do it without realising the full significance, but there are some who think there is little difference between the one period and the other. Another thing is that you do not get the moisture into the subsoil unless you get on to the fallow land in good time. The water runs off and evaporates rapidly. When you have got it lying in the furrows it goes in deeply. It has been said that moisture that has gone down 10ft. will come back again in the dry weather. Get the land open while the rainfall is heavy and the water into it, and unless it is a poor subsoil indeed that moisture will come back again and the wheat will reach it. You found that when you turned up this land in the September or October preceding it would not give such good results this year.

DIRECT NITRATES.

"There are some men, like Dr. Howell who has done a great deal for the Department of Agriculture in Victoria, who think there is a time approaching when the farmers will have to resort to the addition of direct nitrates in their manures. In the wetter districts it should be done now, but in the dry districts there is so little leaching of the nitrates from the land because the rainfall is small that what is put there is not lost, whereas in the heavy rainfall country the nitrates are washed away. I do not think that, for the man who systematically endeavors by early fallowing and through working to keep the moisture there the direct application of nitrates is likely to be required for a long succession of years in the drier country. If he neglects that part of it he will have to be content with a small yield or make it up by the direct application to the land of an expensive manure. There has been a great deal of controversy as to the depth of working for the conservation of moisture. Each farm has its own conditions, and the depth of working is to be suited to the character of the soil and subsoil. It is a never-ending controversy, because the fact is lost sight of that there are no two farms workable in the same manner. Deep working on a fair rainfall you can understand. We hear a good deal about dry farming, and some of the nostrums dinned into our ears are really being applied to the country that is not suitable for it. Our farmers practised dry farming for years, many of them taking the best means of conserving the moisture before the term 'dry farming' was introduced. If deep ploughing lands your plough in open subsoil of brashy limestone it had better be left alone, and in that case shallow ploughing will be more effectual. If you turn up cold clay the paddock will be ruined for years.

THE SUPPLY OF HUMUS.

The third point is—how are South Australian lands to continue to possess a sufficiency of humus for best results? The practice of bare fallowing is one of the best means of burning up the organic matter. Organic matter is plant food, because nitrification of the decomposing ferments reduces it the

more quickly and leaves it in the form of ammonia, nitrites, and nitrates. A thorough fallowing, which gets nitrogen from the air in one way, is removing and lessening another source of nitrogen in the soil, namely, the organic matter. That is one of the best ingredients in the soil to help it to retain moisture. It helps the physical condition of the land. The saving of the position is to allow the land to lie out for a year. I have no belief in the practice of wheat and fallow, wheat and fallow. The land should lie idle the third year to keep the organic matter in it. The point I want to enforce is that it is necessary for the farmer to look to the character of the herbage when the land is lying idle. This is no theoretical vision; it is solid practice. Some people recommend green manure. That may be theoretical, but whatever means you take to keep up the organic matter you should use more phosphate manure than the wheat requires. The farmers are losing sight of the necessity of applying phosphate dressings in sufficient quantity. Forty pounds of superphosphates spread over an acre is not going to have a full fertilising effect. In it there are 6lbs. or 8lbs. of phosphoric acid. This is what is wanted, but this quantity only means 1lb. to 600 sq. yds. You are helping the position a little, because you give it a start, and you are giving a great physical activity to the plant. But you should apply more to your land than your crop is likely to take from it, so as to leave an appreciable residuum in the soil, and thereby encourage the density of the feed in the year it is lying out. If you put on 140lbs. you will find a thick sward of trefoils. This point should be remembered by farmers. Even if you do not get any more wheat your extra $\frac{3}{4}$ cwt. cost you 4s., and you will get 4s. back with interest on the increased carrying capacity of the acre of ewes and lambs. Wheat and sheep go together, and by using a heavier dressing of phosphatic manure you are not only increasing nitrogen from the organic matter, but also increasing the nitrogen from this association of ferments.

At the conclusion of the address several delegates gave their experience with reference to the application of manures, and the results attending early and late fallowing.



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* No report received during the month of October. † Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by GEORGE G. NICHOLLS.

[NOTE.—As a full report of Congress appears in the October number and this issue, delegates' reports to Branches have, in many instances, necessarily been classed as formal.—Ed.]

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

Arden Vale and Wyacca, October 2.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. J. H. Willis (chair), Eckert, Fricker, Hannemann, Absalom, Eckert, Liebich, W., J., and T. E. Klingberg, Starr, Paynter, Hannemann (Hon. Sec.), and four visitors.

BUILDING HAYSTACKS.—Mr. Paynter read a paper on this subject, in which he said that before stacking it was necessary to ascertain whether the hay was in fit condition for stacking. If the pith at the second knot of hay taken from the centre of a stook was thoroughly dry, the hay was ready. He preferred square-cornered stacks. When laying out the stack he would first put the outside ring with butts outward; then bind with the heads as far as the bands, and keep on binding in the same manner until the bed was filled. On the second layer he would place the corners in the opposite direction, and so on until the stack was ready for roofing. Before roofing it was essential to see that the stack was level. He would go as far as possible with one layer outwards, overlapping the stem so as to form an eave. The next layer could be placed with the heads outward, and the middle should be kept full and tight. If the stack was not to be thatched, it could be roofed with the heads outward. In reply to a question, Mr. Paynter said that all haystacks should be thatched.

Warcowie, October 3.

PRESENT.—Messrs. T. Donnellan (chair), Telfer, Ryan, Jarvis, Newton, E. and W. Sanders, Crossman, J. and G. Duffy, P. Donnellan, Feineler (Hon. Sec.), and six visitors.

DAIRYING IN WARCOWIE DISTRICT.—Mr. Telfer dealt with this subject in the following paper:—"If we are to be successful farmers we must gather our income from as many sources as possible. We have proved that we cannot always depend on our wheat crops for a livelihood; neither are we always sure of an abundance of feed for cows. We have in time past seen many seasons when wheat-growing did not pay working expenses, while yet in these same seasons good money was made from cows. Of course, dairying entails a lot of labor, and wages are now high, and labor is not always obtainable even at the high rate now ruling. Therefore dairying can only be made to pay well by those who have their own labor. If we wish to make the cow pay, we must first of all see that we have a good cow. We must bear in mind that it will not take any more to feed a good, well-bred cow than it will to feed an inferior beast, while the extra butter-fat from the good cow is all profit. A great deal can be done in this respect by careful selection, and by always

weeding out the worst of the dairying herd, and by only breeding from the best. No pains should be spared to secure a good bull, bred from a good reliable milking strain. A good cow will only give you one calf each year, but a good bull will in four or five years increase and improve the whole herd. It is, in my opinion, a great mistake for a dairyman to go in for a breed of beefy cattle, for a beefy cow will take more feed, which means that less cattle can be kept on the available pastures. Then, again, the beefy cow is seldom so good a milker, so that one may have to take less per head for the milking strain. More of the lighter cattle can be grazed on the same pasture, and they will give a much better yield of butter-fat. A man who goes in for a light milking strain will come out right every time. Personally, I favor the Jersey breed; I have proved these to be good milkers, and they do well here. Another matter which should have careful attention is the milking. The cows should be milked as near to the same hour each day as possible, or they will not do so well. They should also, if possible, be milked by the same person each day, and they should never be worried. Too much stress cannot be laid on the necessity for cleanliness in milking and handling of the milk, as nothing is so easily tainted as milk, and taint means loss of quality and consequently loss of prices. Then comes the question of feeding the cows. I consider that provision should always be made for feeding during the autumn and winter months, when the natural food is of poor quality and scarce. Cows should never be allowed to go off, as it takes a long while to make up what is lost in a few weeks. Last, but not least, comes the question of how to get the produce to the best market, in the best condition, and at the lowest cost. I think that the Government should be urged to assist more in this direction. They should assist in establishing creameries in the country towns, and they should run freezing cars on their railways in the summer time." In the discussion which followed it was suggested that Warcovie was not suited for dairying, as the distance from the railway station was too great to market the produce, and there was no local market. For all the dairying that was likely to be done the Shorthorn milking strain would be a better class of cow to keep. The Hon. Secretary thought it was not advisable for farmers to keep and breed Jersey cattle, as this was not a very suitable district for dairying. The local value of these cattle was far below that of the bigger class of stock. If a Jersey strain were introduced it would greatly lessen the value of the herd. Steers were of greater value than cows or heifers at present, as working bullocks were greatly in demand.

Wirrabara, September 9.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. T. J. Curnow (chair), P. and H. Lawson, E. J. and W. Stevens, Borgas, Pitman, Hoskins, H. and J. Hollitt, Woodlands, Kendrick, and H. Woodlands (Hon. Sec.).

CARCASS PORK AND BACON FOR EXPORT.—Mr. J. Kendrick read the following paper on this subject:—"In last month's issue of the *Journal of Agriculture*, I noticed that this subject was introduced by Mr. A. M. Dawkins at the Agricultural Advisory Board meeting and was well received by the other members. I am of the opinion that a bacon trade with Great Britain could soon be established, and with the present facilities at the Produce Depot I should like to see the Government take this matter in hand and purchase, say, 40 to 50 head of ideal baconers and test the English market before launching out on a big scale. The Government have fostered the lamb export trade very well indeed, and the growers have derived great benefits from this particular industry. The export of bacon and by-products, such as lard, kidneys, and sausage skins could be carried out just as well as the lamb trade, and this would mean another strong string to the producer's bow. I do not think it would be a wise thing to slaughter hogs and export the carcasses in a frozen state, for my eight years' experience in the trade in England satisfies me, that Ireland would prove too great a competitor in the carcass trade, as she sends hundreds of pigs into England every week. Bacon-curing is not carried out extensively by the butchers in England as it is more profitable to them to work up the flesh into all kinds of small goods, whilst tons of pork is casked up yearly for sea use. Hog raising and curing has been brought to perfection in America, and scores of men have made fortunes out of the animal that is somewhat despised in Australia. In my opinion Australia is highly adaptable for hog-raising, and I trust that I shall live to see the day when the bacon export in Australia will be on a par with the lamb and mutton export trade. Speaking of America, the following facts may prove interesting:—An interesting comparison is provided by the

statistics showing the number of pigs killed in Chicago and the number sold in Melbourne. At Chicago, famous for its utilisation of every bit of the pig save the squeal, for the period ending March 1st, 1909, the pigs slaughtered in all the principal centres totalled 28,986,633, and for the 12 months ending March 1st, 1910, 24,162,295, showing a falling off of over four and three-quarter millions. For the six months from March 1st, 1910, to August 30th, 1910, the decrease in pigs killed amounted to 540,000; and for the 11 weeks extending from November 1st, 1910, to January 19th, 1911, the total falling-off of killing, as compared with the same period in the previous year, amounted to 450,000. In Melbourne the pigs-yards from 1902 annually to 1910 have been as follows—90,940, 58,791, 77,640, 91,701, 97,843, 95,557, 78,569, 78,140, and 98,368. The total for eight years amounts to 767,548. In South Australia production could be enormously increased if there were any guarantee of stable markets. Swine fever has been stamped out for the time being, and the vigilance being maintained by officers of the Stock Department is not likely to allow the disease at any time to spread beyond localised areas. There is no animal that pays better than the pig, and by careful breeding and regular and proper feeding the producers of Australia would soon realise the importance of this great industry, which is carried out so successfully in other parts of the world. To come back to breeding, I find that several crosses are required before you can produce a perfect baconer, and I recommend those farmers and others who may make up their minds to move in this matter, to be sure and lay the foundation with good constituted pigs. Do not start breeding from squibs or ill-bred brutes, but get the best boars and sows it is possible to procure. In breeding, I have proved that the following crosses are the most profitable. Firstly, secure a good, roomy, middle White Yorkshire sow, and tip with a pure Berkshire boar. On the progeny of this cross use a pure Tamworth boar, and you will have a pig that will be fit to go into any butcher's shop or bacon-curing factory in the world. Do not run away with the idea that the bigger the pig the better, for this is altogether wrong. Ideal baconers scale out at nothing more than 130lbs., and when they draw the scale at over that weight, they are considered too coarse, and are not sought for by the curers. Bacon-curing in Australia is an industry that should be grasped by our Government, and pushed along for all it is worth; and to encourage the industry I consider it would be a capital idea, providing the Government takes the matter in hand as suggested in the first part of my paper, if they were to purchase a number of pure-bred boars and circulate them over the State at different centres for the use of those that would take a keen interest in this particular industry. The growers would find the sows. To conclude, I maintain that under Government supervision of slaughtering and curing, Australian bacon should be able to compete with that of any other producing country."

Wirrabara, October 6.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. Curnow (chair), Woodland, Marnier, Borgas, E. J. and W. Stevens, Kendrick, P. and H. Lawson, Stott, E., J., and G. Hollett, Hoskins, Bowman, Thistleton, and Woodlands (Hon. Sec.).

LUCERNE.—Mr. J. F. Pitman tabled four varieties of lucerne, viz., Hunter River, Arabian, South Australian, and one variety the name of which he did not know. He also read the following short paper:—"I find that if good, true seed is secured, once the plot is established one cannot grow anything that will return more feed per acre than lucerne. Stable refuse is the best manure for lucerne-growing, the most suitable time to manure being early in the winter. It is necessary to work the manure well into the ground, and it will keep the lucerne growing through the winter. This will give an extra cutting for the year; it also helps to keep the ground loose in the summer. The Arabian seed is not suited to the Wirrabara forest district. It begins to die back at the top rather quickly; consequently it does not grow as high as the other sorts, and this means a poorer return. Both South Australian and pure Hunter River do splendidly here. My opinion is that a plot of lucerne well looked after is a most remunerative crop, provided the variety grown is suitable to the district." In reply to a question, Mr. Pitman said the best time to sow lucerne was in August. If sown earlier frost was likely to injure the plants.

FARM GARDENS.—Mr. H. Lawson read the following paper:—"Probably all of us have at some time or other been struck with the bareness of some farm homesteads. I consider everyone should make an effort to grow some trees round the homestead; but of course we all look for something from which we will derive a profit. Therefore the absence of direct profit prevents many from growing ornamental trees. It may be

said that gardens will not do on farms where there is no water. As a proof that this is not so, we have plenty of well-established gardens on farms throughout the North which are entirely dependent on the rain for their water supply. In my opinion the great essential is to find out from those around you what trees do best in your district, and plant only those varieties. The next thing is to plant only as much as can be properly attended; and in order to economise labor in cultivating, plant on the square with plenty of room between the trees. Keep the soil well worked by running the harrows over it after every rain during the summer months. I am not a gardener, but I am trying to point out to the farmer how he may improve his farm and make his home more attractive by having a garden."

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Narridy, September 30.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. P. Smart (chair), Darley, Haren, Liddle, Reinke, Browne, Darley, jun., Reynolds, and Kelly (Hon. Sec.).

WEIGHING WHEAT IN BULK.—After the delegates to Congress had presented their report a lengthy discussion took place on this subject. Members were in favor of the proposal, as there would be less trouble in getting the load off. It was thought that from ½ lb. to 1 lb. was lost per bag when weighed singly, which amounts to from 15 lbs. to 45 lbs. on a 60-bag load.

Port Pirie, September 8.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Munday (chair), McEwin, Welch, Hawkins, Johns, Lawrie, Greig, Dick, Wright (Hon. Sec.), and two visitors.

HOMESTRAD MEETING.—The meeting was held at the residence of Mr. H. Hawkins. The crops, stock, implements, &c., were inspected, and a large paddock of Pratt's Comeback wheat was found to be of good uniform growth, and promised a good return. The vegetable, fruit, and flower gardens called for the admiration of members.

DESTRUCTION OF WEEDS WITH CHEMICALS.—Mr. Hawkins introduced this subject for discussion by reading a paper by Mr. T. A. Wilson, of Miltalie Branch. Mr. Johns said that if a cheap compound could be found which would kill weeds on fallow on a large scale it would no doubt meet with a hearty reception. Mr. Greig said the application of chemicals for the destruction of weeds was not altogether a novel idea. A difficulty in regard to the method was that the poisonous liquid was apt to corrode the implement used for its distribution. The question of expense would have to be carefully considered. Mr. Greig said land worked and kept clean for 12 months would grow a good crop of dandelions. It would be necessary to apply the poisonous solution to the weeds when there was no other crop on the ground. Mr. Wilson was deserving of thanks for bringing the matter forward, and it was to be hoped that the prophecy would have some influence on scientists and manufacturers. Mr. Hawkins said a similar method had been used on the railway reserves, but it had affected the health of the men who used it. A method such as advocated would be of advantage for destruction of weeds on sandhills, where too much cultivating caused drift. Mr. McEwin said it would be necessary to apply such a poison many times during the year—for summer and winter weeds. The method probably would be dangerous to stock. Mr. Dick thought the method would be all right if weeds could be destroyed without killing the grass also. The Chairman said the idea had been tried at various times with more or less success. The cost of the method would

probably be prohibitive. Weed seeds germinated at various times, and it would be necessary to destroy each succeeding crop. If a strong solution was used it might have an injurious effect on the following wheat crop. The continuous use of same might cause a reaction and be injurious to the soil. There would also be a danger to stock where used. District councils might experiment in this direction, so that farmers could benefit from results. Perhaps after all the cultivator and the hoe were the best weed killers.

Whyte-Yarcowie, October 7.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Lock (chair), Mitchell (two), Pearce (two), McCann, Faulkner, McLeod, W. Hunt, J. Walsh, Jenkins (Hon. Sec.), and four visitors.

AGRICULTURAL MOTORS.—Mr. W. Hunt read the following paper on this subject:—
 “Two great agricultural countries, neighbors and competitors, are rapidly becoming alive to the tremendous possibilities of power machinery in their development and the production of food by which not only their own people, but a large part of the rest of the world, are to be sustained. The United States of America at the present time has an area of nearly 200 millions acres, and it seems almost incredible that the value of power-operated machinery to the producer is not more fully realised. The records of the United States of America Department of Agriculture show that tractors are in use on about eight million acres of cultivated land; but this means only about 4 per cent. of the actual land devoted to crop production. These figures show that the remainder of this large area is still cultivated by animal power. The importance of the results which have been accomplished by power machines, whether operated by steam, gasoline, or electric power, is not fully realised. Even allowing for greater first cost for supplies and repairs, the increase in capacity is so great as to warrant the statement that one of the greatest of national wastes is due to the tillage of the soil by animal power. Abundant data is available to prove this statement, for tests have been made on the larger farms of the western States of America which show the great economy and capacity of steam power when applied for traction purposes. Since the tractor was first used in 1900 its numbers have increased until at present nearly 10,000 are at work; their haulage capacity varying in horse power according to the work required. The reason for its popularity is that the tractor is suitable for a variety of purposes. It is said that in the ploughing and cultivating of heavy lands, such as clay soil and the black muck so abundant in the west of America, and the stiff, sod-covered prairie, the engine can draw a series of ploughs where four horses could not pull one implement. Steam engines used for ploughing are rated at from 20 to 50 horsepower, 25 to 30 being the usual size. From 15 to 40 horsepower is the usual size used in gasoline tractors. The steam plough engines weigh from 7 tons to 20 tons, and cost from £350 to £650 in America. The usual weight of the gasoline tractor is from 6 tons to 12 tons, and they cost about the same as the steam tractors. On the Pacific coast the engine is usually larger, averaging about 60 horsepower, and costing from £1,000 to £1,200. In California some of the owners of large outfits plough nearly 3,500 acres annually. The average durability of the outfit is estimated at 15 years, or more than 50,000 acres per plough, in addition to other work, such as threshing, &c. A crew of from three to six men is required to operate a large steam plough. The prices charged for ploughing range from 3s. 3d. to £1 per acre, the lower rate being for stubble ploughing, and higher for breaking sod. The plains of western Canada have recently developed into wheat fields with the aid of mechanical power. In 1900, when the tractor was first used successfully, there were fewer than 2,500,000 acres sown to wheat between Winnipeg and the mountains. These great tracts of Canada have shown not merely the importance, but the necessity, of power farming. Grain is grown on what was once prairie land. This is of a hard composition. There are fields of several hundreds acres. Hundred-acre fields are numerous. It would be impossible to cultivate these fields with horse power except at a great expense and loss of time to the farming community. Here is an illustration in point. In Saskatchewan a section of rich wild sod land was broken in 22 hours; three steam outfits working continuously in order to get the land ploughed immediately. The result was that the owner was able to sow the entire 640 acres immediately instead of only a small portion of it, as would have been the case if he had to depend upon the team. Several types of tractors are in use for agriculture. The largest size has driving wheels 8ft. in diameter, with 60in. face of tire. The lead wheel is 5ft. in diameter, with 48in. face of tire. Such

large wheels give the engine tremendous bearing surface, enabling the tractor to go over very soft ground. This engine develops 110 horsepower on the crank shaft, and pulls six gangs of ploughs, cutting a furrow each time of about 36ft. in width, travelling at the rate of three miles per hour. It will haul a steam combined harvester, clearing a swath of 35ft. in width. It cuts, cleans, threshes, and sacks the grain from 100 to 125 acres each day, at a cost of not exceeding 1s. 3d. per acre. A smaller size, used for hauling supplies and wagons, has a capacity of 50 tons, depending on the conditions. This engine has a speed of three miles per hour. These engines are made by the Best Manufacturing Company, are of a Western design, and intended for use on the soft, loose lands. The broad wheels prevent them from sinking. For the small farms similar to those in this State, the tractor, if driven by an internal combustion engine, should be as economical as horse power, since it can be used in so many kinds of agricultural work. This type of tractor marks a new era in power application to agriculture, and is in service in America and Europe. Its advantages over steam power includes higher efficiency, economy, and convenience. Its freedom from sparks and danger of fire whilst in the harvest field is sure to tell in its favor in these States. A short description of a few of the leading makes may be perhaps interesting. There are several different types on the market at the present time. One of the strongest and best built of English makes is the 'Colonial,' built by Messrs. Marshall, Sons, & Co., of Gainsborough, England. This company builds two sizes of Colonial tractors for use in the colonies. The larger has a four-cylinder engine, developing from 60 to 70 B.H.P., and is guaranteed to do the work of 32 horses. The diameter of the driving wheel is 6ft. 6in., with 24in. face of tire. The front wheels are 4ft. 6in. in diameter, and 12in. wide. The weight of this engine in working order is about 11 tons. The smaller tractor has a two cylinder engine, developing from 30 to 35 B.H.P., and is guaranteed to do the work of 16 horses. The diameter of the driving wheel is 6ft. 6in., and it has 18in. face of tire. The front wheels are 4ft. 6in. with a 9in. face of tire. The weight of this engine in working order is 8 tons. Both of these tractors have a speed of two and a quarter miles per hour. The Hart Barr Company has been building gasoline tractors ever since 1903. It makes three sizes of tractors, a 30 horsepower, 45 horsepower, and an 80 B.H.P. The most popular size is the 45 horsepower, which has a twin-cylinder engine, and is guaranteed to do the work of 22 horses. It has driving wheels 5ft. 6in. in diameter, with a 24in. tire. The front wheels are 3ft. 8in. in diameter, with a 12in. tire. The weight is about 9 tons, and it has a speed of about two and a half miles per hour. The 80 horsepower engine is guaranteed to do the work of 40 horses. The diameter of the driving wheels is 8ft. 4in., and it has a 28in. tyre. The front wheels are 4ft. 3in. in diameter, and have 14in. tires. This engine weighs about 16 tons, and has two speeds, viz., two and a half and three and a half miles per hour. Two other American companies who build light machines with high drivers are the Gas Traction Company, and the Kinnard Hains Company. Both these companies use four-cylinder engines in their tractors. The Gas Traction Company's engine is guaranteed to do the work of 30 horses, has driving wheels 8ft. in diameter, and 18in. tires, and weighs from 6 tons to 7 tons. When required for ploughing this engine is fitted with a guide wheel, which runs in the furrow in front of the tractor, and is connected with the steering wheels of the tractor. This wheel automatically guides the engine from one end of the field to the other, thus doing away with hand-steering except turning at the ends. The Kinnard Hains Company's engine is built on similar lines to the Gas Traction Company's engine. There are several other American and English firms who are building petrol and oil tractors suitable for agricultural work, and are building small machines which would be more suitable for small farms. Most of these machines are really only in the experimental stage. This year's Winnipeg competition of agricultural motors was held under rather adverse conditions. The field in which the ploughing was done was low-lying and very wet. Several of the steamers really made a pitiable exhibition, sinking in the soft ground right up to their hubs, and having to be dragged out by the lighter gasoline tractors. The internal combustion engines seem to have had little trouble in traversing the soft soil. The light four-cylinder high-wheel tractors took nearly all the prizes. This competition clearly shows the superior points of the internal combustion tractor over the steamer in working under adverse conditions similar to those which prevailed at this competition." In the discussion which followed the reading of the paper the Chairman pointed out that the chief difficulty with motor traction for ploughing was that the tractors sank into the ground 3in. or 4in., when the land was soft; consequently the ploughing on such wheel tracks was very shallow.

WHEAT PEST.—Mr. Pearce reported that a parasite much resembling cabbage blight was attacking wheat plants in the district.

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

Blyth, October 10.

PRESENT.—Messrs. A. L. McEwin (chair), Zweek, Eime, Gell, Lehmann, Longmire, Schulze, Williams, Roberts, Pedler, and two visitors.

SUMMER WORKING OF FALLOW.—Mr. M. S. Longmire contributed the following paper:—"I advocate summer working of the fallow when the ground is damp, but not if the ground is dry. If the fallow is not worked down well in the spring time, run a set of harrows over it after a rain, as it smoothes the surface and turns the soil about so as to start any weeds which may be in the ground. If the ground has been well worked down beforehand a set of scarifier harrows is a splendid thing to use. I prefer these to a cultivator, because they turn the ground about just as much and make it much finer. Apart from the land deriving a benefit as regards retaining moisture for the coming crop, which of course is certain if the ground has been well worked, it pays to work the fallow after summer rains merely for the benefit of seeding, as the land pulls much lighter in seeding time, and the weeds are not so strong and will not be so hard to kill. I have often seen fallow paddocks in April covered with weeds and have wondered why farmers have left them in such a state for seeding. If they have a wet seeding it is impossible to kill the rubbish. A thick coat of rubbish turned down does not make a good seed bed." Members were of the same opinion as the writer with regard to the subject.

Northfield, October 10.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Williams (chair), N. S. and E. W. Kelly, Eastwood, Goldney, Westphal, Kimber, Roeger, Wright, Mitchell (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—Members inspected the homestead and farm of Mr. Goldney, after which Mr. Kimber read a paper by Mr. Geo. Speed, of Mount Druitt, New South Wales, on "Poisoning Sparrows." Members decided to take united action in attempting to eradicate the pest.

YORKE PENINSULA DISTRICT. (TO BUTTE.)

Maitland, October 7.

(Average annual rainfall, 19½in.)

PRESENT.—Messrs. Opie (chair), Bawden, Bentley, Heilemann, Hill, Lietz, Tossell, and Pitcher (Hon. Sec.).

STAR THISTLES.—Mr. Hill pointed out that on some of the roads the star thistle was beginning to appear. The observant man would see that this was destroyed before it got out of hand.

CEMENT FENCING POSTS.—Mr. Leitz read the following short paper:—"It is profitable to use reinforced cement posts for fencing in localities where white ants are numerous. The first cost is a trifle more than that of wooden posts, and there is more labor attached to fencing, but a fence erected with concrete posts properly reinforced is practically indestructible. For ordinary fencing posts 6in. by 4in. at the bottom, tapering to 4in. by 3in. at the top, would be sufficient. They could be made in boxes constructed of three boards—one for the bottom 6in. at one end by 4in. at the other, and two for sides 5½in. at one end and 4½in. at the other. The timber should be 1½in. Oregon. The concrete should be one part cement to two of sharp sand, and two of good, clean gravel or finely broken stone. It is necessary to put a layer of this in the box, and then put in three or four barbed wires, or plain wires bent at the ends, the whole length of the post. Then fill in more concrete, put in more wires and fill box with concrete, taking care to have it smooth on

top. Pieces of, say, $\frac{1}{2}$ in. iron should be put in to make the holes for the wires, for which holes should be bored in the bottom of the box. These should be removed before the concrete is fully set.

GRADING SEED WHEAT.—Members expressed their opinion in favor of the grading of seed wheat. It was found that the plants came up better and stronger when the seed had been carefully graded.

Pine Forest, October 10.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. Johns (chair), D. Carman, A. Nelson, C. Schultz, G. Inkster, C. W. Smelt, A. Hewitt, S. Barr, and R. D. Goodridge (Hon. Sec.).

INSPECTION OF EXPERIMENTAL PLOTS.—The members paid a visit to the experimental plots which were being carried on by Mr. S. Barr at Bews. The plots were situated in the centre of a 200-acre paddock, and were found to be looking splendid, and members were most favorably impressed with their appearance. Very little difference could be seen at the present in the different plots, some of which had been dressed with extra super., others with potash, and others with ammonia. The harvest, however, would be looked to with interest. The paddock right through looked splendid, and under favorable circumstances should give a good yield. It was resolved that the plots be visited again in a month's time.

ANNUAL CONGRESS.—The delegates reported on the meeting of delegates held in Adelaide during Show week. The opinion was expressed that too many subjects were included on the agenda paper, which prevented any subject being dealt with in a satisfactory manner. Only 8min. were allowed for discussion of certain subjects, with the result that votes were taken before members had an opportunity to discuss them.

NOXIOUS WEEDS.—The opinion was expressed by members that noxious weeds were not so prevalent as in previous seasons.

WESTERN DISTRICT.

Butler, September 14.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. Phillis, Butler, France, Jericho (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—The meeting was held at the residence of Mr. R. W. Phillis. Plots of Gluyas, King's White and King's Red wheats, the seed of which had been procured from the Roseworthy Agricultural College, were inspected. They were sown on fallow ground in June, and gave appearance of being very early. Takeall was not so prevalent this year as last. The poultry and machinery were inspected. Mr. Phillis explained that it was cheapest and quickest to take the crop in with the harvester. Mr. Butler was of opinion that the harvester dirtied the land where there was charlock, but it was pointed out that the stripper could not get at the seed of charlock, and usually the seed was on the ground before the machine went over it.

Elbow Hill, October 7.

PRESENT.—Messrs. Cooper (chair), Dunn, Freeth, Wake, Wheeler, Morgan, Chilman, Tilley, Wake (Hon. Sec.), and four visitors.

CO-OPERATION IN THE MARKETING OF FARM PRODUCE.—Mr. Jacobs read a short paper dealing with this subject. He said there were too many agents and middlemen, who drew a considerable profit, engaged in the marketing of produce. He urged the necessity for co-operation on the part of producers so as to do away with this large body. The South Australian Farmers' Union was an organisation which should have the support of every farmer. Considerable discussion ensued, in which the opinion was freely expressed that for their mutual benefit producers should become members of the above-named society.

Green Patch, October 9.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. Gore (chair), J. Sinclair, sen. and jun., R. and P. Sinclair, Merchant, McFarlane, Whillas (Hon. Sec.), and two visitors.

1. SHEEP FOR THE PORT LINCOLN DISTRICT.—Mr. R. Sinclair read the following paper:—
 “In the Port Lincoln district for many years past the Merino sheep has been the principal breed kept, and until there is a better outlet for fat lambs this sheep will hold pride of place. If farmers here had chances to dispose of their fat stock I am quite sure by planting fodders fat lambs could be as profitably raised here as in other places. Until such conditions prevail I would recommend farmers to keep to the Merino, as it is a good, hardy sheep, cuts a heavy fleece, and always commands a good price for its wool. To get the sheep desired, first select good, young ewes. A good ewe will not eat any more than an inferior one, and where a farmer has only a limited quantity of feed it is naturally far better to keep a ewe that will cut 10lbs. than an old cull cutting, say, 4lbs. to 5lbs. Farmers should always buy their rams from reputable breeders, bearing in mind that a robust Merino sheep, having a strong fleece of good length, is the most serviceable. Unless a farmer has had a wide experience in sheep-breeding, he should not under any consideration save rams from his own flock. It is a very good plan for neighbors to purchase rams from the same flock, and exchange after two or three years' service. Sheep should be culled at shearing time, so that the poor-woolled ones, as well as the old ones, are thrown out. It is preferable to keep an aged sheep with a good fleece than a young one with a poor fleece. Shear culls early and put them in a good paddock where they will fatten quickly, and they will bring in a very much better return than if sold off the shears. Always tail lambs before they get too big, for a young lamb will recover from the effects of the operation much quicker than an older one. Where lambs have been missed in the first year, and it is necessary to castrate them as yearlings, on no account do this until September, or later, for if castrated in the cold weather the death rate will be high. This also applies to old rams.” In reply to questions the writer advised members to castrate old rams at shearing time. In this district a well-kept flock of Merinos should return an average of 6s. per head for wool. He had killed eight months' Merino lambs this season, which had weighed 60lbs. when dressed.

RAPE.—Several instances were given of excellent returns from small paddocks of rape. Twelve acres on the Tiataka Estate had fattened 600 ewes and lambs. Mr. McFarlane said he had done well with spring rape, and it would pay to sow all fallow with this feed. Members agreed that more rape could be grown in the district with advantage.

Koppio, October 5.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. F. Richardson (chair), M. and T. Gardner, G. and M. Howard, Brennand, Barraud, Thompson, R., F., and W. R. Richardson (Hon. Sec.), and two visitors.

ANNUAL MEETING.—The Hon. Secretary reported that during the year 11 meetings had been held, with an average attendance of seven. Papers were read on the following subjects:—“Sheep,” “Cropping,” “Draining Wheat Land,” “Mixed Farming,” and miscellaneous subjects; in addition to which two homestead meetings were held.

FODDERS.—Mr. Howard tabled sample of lucerne grown in oaten hay, peas grown without manure, and wheat grown without manure, all of which showed excellent growth.

Miltalie, October 7.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. Storey (chair), J. W. and E. Storey, Smith, Ahn, O. and J. Kobelt, F. and B. Jacobs, Wilson, A. and J. Ramsey, and W. E. Heir (Hon. Sec.).

Mr. W. G. Smith contributed an interesting paper in which he dealt with the following matters:—

RABBIT-PROOF FENCING.—When putting up a wire netting fence, he advised laying 8in. of the bottom of the netting on the ground, outwards. Three feet 6in. netting of 1½in. mesh should be used. Stones and earth should be placed on the portion lying on the ground, which would have the effect of keeping it firm. Judgment must be used in covering the projecting portion of the netting. This method was less expensive and more

effective than trenching. He had five miles of fencing of this nature, where rabbits were very plentiful, and in no case had he known of the rodents digging their way under the fence, unless by way of a burrow. When trouble was experienced with the pig-nosed pinkeye, the most satisfactory method of disposing of it was by trapping.

CARE OF TOOLS.—The handles of tools, such as axes, shovels, and picks, should be kept well greased. This not only preserved the handle, but in cold weather when this was done the hands of the worker were not so likely to become chapped.

HANDLING SHEEPSKINS.—When sheepskins were being packed for market, it was always advisable to keep the wool outwards. If the pelt was packed outwards there was danger of its being torn, which would naturally affect the value of the skin. At least two tickets should be attached to each bundle of skins, and in addition the initials of the consignor should be put on the wool with stencils and ink, or, as an alternative, a label put inside the bundle.

SLINGING HORSES.—In addition to the time and trouble entailed in securing a suitable sling for a horse in case of emergency, the animal when slung was very frequently subjected to the effects of the weather. Except in cases where the animal had sustained a broken limb, or where the ground was hard, it was preferable to sink two trenches as near as possible to the hoofs of the animal, care being taken that they were the right size, depth, and distance apart. A bag of sand should be placed on either side of the horse to keep it steady and warm.

FIRING SCRUB.—Where there were patches of hilly and scrubby land, too small or rough for cultivation, he advised occasional firing. After the fire had been through cocksbur seed could be sown. As this grew well after scrub had been burnt, there should be fair pasture for sheep and cattle. In addition, the cocksbur would probably carry a second or even a third fire, with the result that shoots would not gain a footing.

GRINDSTONES.—The writer considered it advisable to have a treadle affixed to the grindstone. The stone should never be turned against the axe, as this made the stone bumpy. A simple method of rigging a treadle to the stone was explained.

Penong, October 14.

(Average annual rainfall, 12½ in.)

PRESENT.—**MEMBERS.** A. F. Grad (chair), Sanders, Prider, Wold, J. B. and J. Outs (Hon. Sec.).

HOW TO IMPROVE THE WORK OF THE AGRICULTURAL BUREAU.—This subject was dealt with in the following paper by Mr. A. G. Luff:—"With the exception of a few in the neighborhood of Port Lincoln, there are only three Branches of the Agricultural Bureau viz., Penong, Petina, and Colton, between Port Lincoln and Fowler's Bay, a distance of about 400 miles. The country between Port Lincoln and Fowler's Bay is the real 'West Coast,' as the Railways Commissioner and the representatives of the Adelaide press who recently visited it have apparently just discovered; and it is chiefly with the object of extending the work of the Bureau in this vast district, and to suggest a means by which the possibilities of the West Coast can be more widely known, that I am writing this paper. It is quite possible that many people on the West Coast, owing to their distance from more settled parts, do not know of the existence of the Bureau because it does not advertise sufficiently. I suggest, therefore, that the Government should advertise in the newspapers the advantages of joining the Bureau. A good many would become acquainted with the existence of the Bureau by this means, but there are still a number who do not read the newspapers; so these must be dealt with in another manner, namely, through the post office. A poster should be sent for exhibition outside the various post offices where there is no Branch, setting out shortly the objects of the Bureau and the benefits it confers on farmers, and inviting correspondence from the inhabitants of the district, giving particulars of local conditions and requests for further information. I believe a good many more Branches could be formed on the West Coast and in other parts if this suggestion were adopted. The average farmer, especially one just commencing, does not realise what a lot he has to learn. A man can learn a good deal by practical experience, but if he relied on this alone it would take him a long time to solve all the problems which he has to face. If he only took the trouble to read, he would find out that a good many of these problems have been solved already. The Government of this State employ a large number of experts to conduct experiments and to investigate all branches of agriculture, and their reports are published in the *Journal*. Many other countries, especially the United States of America, have the same problems to solve as this country, and the results of the investigations and experiments

of experts employed by the Government of those countries are also published, and are available to everyone. An individual farmer could not of course afford to obtain an adequate collection of the various books and pamphlets which have been published, and even if he were able to do so he might form wrong ideas if he did not discuss the various matters with his neighbors. Every Branch of the Bureau should have a library, as it would be of use for the purpose of obtaining information and finding subjects for discussion, especially in remote and newly-settled districts. I am aware of the existence of the Inquiry Department, but this would not be of much assistance to a farmer who, for instance, wrote inquiring about a horse ailment, as it might perhaps be a fortnight or even a month before he got a reply, as it takes anything up to a week for a letter to get from the West Coast to Adelaide. If he were to telegraph he would have to send a long telegram to put his inquiry in such a way that it could be understood thoroughly. I suggest that the secretary of each Branch should furnish the head office of the Bureau with a complete record of local conditions, such as particulars of rainfall, different classes of soil, varieties of timber or scrub, and any other useful information concerning his district; and also send specimens of the different kinds of natural plants and grasses, and any insect pests which might be doing damage to the crops. These records should be filed at the head office of the Bureau, so that each Branch could be supplied from time to time with publications on subjects applicable to the conditions of the district. While on the subject of libraries I may say that the suggestion made by the Secretary of the Advisory Board that if each Branch were to subscribe an amount to cover cost, the Department would reserve copies of the *Journal* and have them bound in complete volumes, to be kept at the meeting place of each Branch, is a very good one; but if back volumes could be supplied in the same way, it would be better still, as many questions which keep cropping up have already been dealt with in previous numbers of the *Journal*. I will now deal fully with a suggestion made by the writer of one of the papers read at Congress, namely, that some meetings of the Branches might take the form of lantern lectures. The writer does not suggest where the subjects for the lectures should come from. There are in most districts people who would be able to deliver lectures, but they may not have the time to prepare them or the material at hand from which to obtain a subject for the purpose. I suggest, therefore, that papers on various subjects should be prepared by experts, and these papers could be sent to the various Branches and delivered in the form of lectures, accompanied, as suggested, by lantern slides, which could be returned after the lecture was delivered. The value of the cinematograph as an educational agent, quite apart from its use as a means of providing amusement, has not yet been sufficiently realised. It would be of the greatest benefit to farmers and others, especially those in remote districts, if the various cinematograph companies could be induced to arrange tours under the direction and supervision of the Advisory Board of Agriculture for the purpose of exhibiting films on agricultural and scientific subjects. There are not many back country districts which have not a public hall or other building in which an exhibition could be given. I might also suggest another purpose for which the cinematograph could be used, namely, for the purpose of advertising the country, and to induce people to go on the land. Many people in the cities do not realise what a pleasant and healthy occupation farming is, and it would be a revelation to them to see pictures on the screen depicting the various conditions of farm life. The subjects for exhibition would not require any rehearsal. The operator could go into the country with his camera, and he would never be in want of a subject for a picture. The immigration authorities would also find the cinematograph useful for the purpose of showing the people in England the conditions of life in this State, and its resources. There are still a number of people in the old country, particularly in remote districts, whose knowledge of Australia does not extend beyond the possibility of a man coming out here and picking up a few nuggets of gold and going home again with a fortune, or else dying here and leaving his fortune to an impecunious relative." The subject matter of the paper will be discussed at the next meeting.

Petina, October 14.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. W. Penna (chair), Goodhart, G. and G. A. Newbon, Bascombe, Simmonds, Wharf, Howard (assist. Hon. Sec.), and five visitors.

HOMESTEAD MEETING.—The meeting was held at the residence of Mr. J. Wharf. The crops which were looking well, were inspected. Mr. Wharf intended harrowing a fallow paddock, which was very grassy, and then running sheep on it. Three hundred acres of new land sown with Federation and Smart's Early wheats looked well. Much interest

was evinced in an 8ft. Monitor mill which drew water through 55ft. of piping from a well on the seabeach and then forced it 300yds. into a 1,200gall. tank on a hill. The water then gravitated through about one and a half miles of lin. galvanized water piping laid on blocks of wood on the surface. The fall was about 40ft. in the whole length. The storage tank was of masonwork, holding 30,000galls. The wall was 4ft. thick at the bottom, and 2ft. at the top, and 6ft. high; the batter being all on the outside. A mason-work trough ran round the outside. The total cost was about £200. Mr. Wharf described his visit to the Loxton district, Agricultural College, and Yorke's Peninsula. He came back satisfied with the West Coast. He thought it had a great future before it.

SORE SHOULDERS.—Mr. Newbon said his horses were getting bad shoulders. A small hard lump about the size of a marble appeared, the top rubbed off, and a watery fluid was discharged. Members thought the trouble was due to the horses getting too much wheat.

TANK-BUILDING.—Mr. Simmonds read the following paper on this subject:—"The first item in the building of a tank when limited time and means are at one's disposal, is to burn a lime kiln. To do this a hole must be thrown out—say 5ft. deep. In good sinking this can be done with an earth scoop in a few hours. Then cart six or eight loads of stumps, which can be picked up about the paddocks. In building place the largest and soundest of the stumps on the sides of the kiln. This allows the centre of the kiln to burn out first, thus causing the kiln to fall in instead of spreading out. Then select the trunk of a hollow tree for a funnel, placing this in an upright position in the centre of the kiln, with a few dry leaves at the bottom of the funnel. Place a layer of stumps and a layer of stones alternately until the top of the funnel is reached. Now it is ready for lighting, and a few red-hot coals dropped down the funnel sets it alight in a few minutes. A kiln like this will take four or five days to burn clean out, and it is almost impossible for it to fail. For the purpose of measurements take as an example a tank 40ft. long and 16ft. wide on the top, with sloping sides, and 10ft. wide at the bottom, and 6ft. in depth. This can be scooped with a patent scoop and three horses in from one and a half to two days, and if the sinking is good a plough is not needed to start it. Scoop the tank lengthwise. The sides should be trimmed down with a shovel and thrown into the centre of the tank and taken out with the scoop. By using the scoop the earth can be taken clean away from the tank. The stone should be cracked with a stone-napping hammer to about the size of a man's fist, and in building simply place them on the wall, one on top of another to a foot or 18in. high, or as high as they will go without falling down. Now put on the mortar, which should be fairly soft so that it gets well in between the stones. So continue until the top of the tank is reached; then a wall of masonwork a foot high around the top completes the building. Mix the cement in the proportion of two parts of sand to one of cement. This will be found quite strong enough. Get the cement on as quickly as possible, and tar all over with coal tar, before the cement gets too dry. So long as the cement does not adhere to the tar brush it is all right. The tar when put on before the cement gets hard will penetrate further into the cement and make a better wall. This tank should take about two casks of cement and about three drums of coal tar. One man and a boy should sink, build, and complete it in from 10 to 12 days." Mr. Wharf had found it better to build the kiln above ground, as the lime was easier to cart away. All agreed that it was advisable to tar the tank as soon as the cement was firm enough to stand it.

Petina, September 2.

(Average annual rainfall, 12½ in.)

HAY-MAKING.—The following paper was read by Mr. E. W. Keeley at the last meeting of the Branch:—"Hay should be cut as soon as the blossom of the plant has fallen. Some prefer cutting it before to prevent it being too dry, but this causes mildew, which is responsible for the death of a considerable number of stock. Loose hay is far superior to sheaved hay for feeding, as stock very often only eat the heads off sheaved hay, especially when fed at night. Binders should be used only on plain land. It is not advisable to work one in stumpy or rough ground because the vibration damages the machine. Sheaved hay is better to handle than loose hay; lighter work is entailed in loading and unloading; and it is also better for building stacks. For chaffing purposes sheaved hay is better, and can be run through the cutter much faster."

Shannon, October 7.

PRESENT.—Messrs. Proctor (chair), J. Cronin, Williams, Wilkins, Davie, C. B. and I. B. Smith, Inglis, M. and T. Cronin, Dollard, and J. J. Cronin (Hon. Sec.),

FODDER CROPS.—Mr. M. Cronin read the following paper on the production of fodder crops:—"The question of growing fodder should occupy a good deal more of our attention, especially in new country like this. It is not profitable for a man to have to take his horses away at this time of the year, when with a very little trouble in the seeding he could have any amount of feed. A good plan is to have, say, two or three small paddocks, which can be fed off in rotation. In one paddock I would sow Cape barley, as it is far the sweetest fodder and has a rapid growth after being eaten. I would sow it without super., as it is sweeter and the horses and cattle eat it better. About 40lbs. of seed would be sufficient for an acre. As much stable manure as can be procured should be applied. In another I would have a fodder, such as rape, kale, sorghum, or lucerne, or even an early variety of wheat, such as King's Early, Newman's, or Gluyas. Any one of these would do for greenfeed. I prefer Yandilla King to oats for hay, for, in my opinion, it is far sweeter and better for horses. It will also yield a greater return per acre, which, in this country, is important. I would like to see a few more fodder crops grown in this district, especially when a man takes his horses away and then has to follow them up with shoes to enable them to get about the country. I am sure any labor put forward in this way will repay a hundredfold." In discussing the subject, Mr. Wilkins said he preferred to liberally dress land intended for fodder crops with super. as well as stable manure. Kale was a very good summer fodder.

Yadnarie, October 7.

PRESENT.—Messrs. Schubert (chair), Stubings, Jericho, Spriggs, Brown, Parbs, Deer (Hon. Sec.), and five visitors.

MOTOR TRACTORS.—Mr. Parbs read the following paper:—"Nearly all farmers and users of power condemn the traction engine because they have not taken the time and trouble to find out more about it. If they had, they would, perhaps, change their minds on this subject. If you are working 10 horses you will need at least 40 tons of hay, and 40 tons of hay-chaff at the present price here (£5) will amount to exactly £200. Working 10 horses for three years at £200 will pay for a first-class traction engine. Then there are all the expenses for repairing your harness and tacklings; the time it requires to harness up your horses and taking them to their work, taking them out and taking their harness off, &c. A team of 10 first-class draught horses, provided with harness and hitch chains, would cost you little (if any) less than the first cost of a traction engine. You will admit that you could not possibly work the horse team more than 10 hours consecutively, and if you wanted to continue working that day you would have to hitch up a new team, equally expensive, whereas the engine will keep on working without the slightest additional expense per acre. It will thus be seen that you can in reality do as much, if you are inclined to work a double shift, with one traction engine as you can with two teams costing you in all double the price of one engine. Another point in favor of the engine is that it entails no loss of time through harnessing, hitching, and unhitching, and leading to and from the stables, as is the case with horse teams. Still another is that it needs neither food nor attention while it is idle. I am speaking of gasoline engines in this case, as this sort of engine would, in my opinion, be the most suitable engine for all-round farm work. It will haul your plough, scarifier, drill, scrub roller, binder, harvester, wagon, etc. It will reduce your expenses for horseflesh, harness, and feed to a minimum by enabling you to do away with all your horses except a few required for really light work. There is not the slightest fire risk attached to its use, for it can be set to work and left working with the greatest confidence anywhere and everywhere. It is always ready to begin work at 30 seconds' notice. There is no need to wait for it to finish its feed, as is the case with horses, and is always perfectly willing to keep on working for just as long as you want it to. Weather does not affect it; it goes on steadily working for you whether the day be hot or bitterly cold. It calls for no compassion because it never gets either tired or sick. It does all this for you, and what does it ask of you in return? Nothing further than a little fuel, a little lubricant, and a lad to run it. This is the farm power that will undoubtedly come to stay in Australia as well as in every other civilised country on the globe—come to stay because wherever it has been introduced it will convince progressive agriculturists that they cannot possibly do without it." In discussing the subject, members agreed that the writer was too optimistic regarding the traction engine. Although horses were expensive, and required considerable attention, until the tractors proved more reliable the former were to be preferred.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, October 6.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Venning (chair), Bone, Gibbs, Watson, Gurner, Fidge (Hon. Sec.), and five visitors.

BREAKWINDS.—Following a report of Congress, this subject was discussed. Mr. Talbot said the best breakwind for this district was made by leaving a strip of scrub at intervals of, say, 30 chains. If the fences were put along these breaks, there would be no difficulty in working the paddock, and good shelter would be provided.

Forster, October 7.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. W. Searle (chair), J., T., H., and L. Searle, Whitfield, Hayman, and Sears (Hon. Sec.).

FENCING AND CLEARING.—Mr. H. Searle read a short paper in which he advised fencing with two or three wires, and posts 4yds. apart and buried to a depth of 15in. to 18in. Boundaries should be fenced with netting in addition. He thought it preferable to cut scrub to make room for grass where the land would not pay for cultivation.

RECREATION FOR FARM HANDS.—Mr. T. Searle contributed a short paper, expressing the view that employers should allow their farm laborers the Saturday half-holiday. He thought this concession would encourage laborers to accept farm work.

Renmark, October 5.

(Average annual rainfall, 11 in.)

PRESENT.—Messrs. Waters (chair), Huggins, Bacey, Braund, Wilkinson, Everard, Smeaton, and Cole (Hon. Sec.).

FODDER CROPS.—Mr. Everard read a paper as follows on this subject:—"Lucerne is the greatest forage crop the world has ever known. It is known in the United States under the Spanish name Alfalfa, literally 'good fodder.' Grecian historians tell us that it was brought from Media, in Asia, to Greece during the reign of Darius, about 500 B.C. Its culture extended to Rome; thence through the Roman Empire, and in latter years through the world. There are 175 distinct varieties of lucerne. What should we think of a 'cocky' who bought seed wheat without stating the variety? The same thing applies to lucerne. The best varieties appear to be Arabian, South Australian, and Turkestan varieties, these making the largest growth in a given time. The term "Hunter River lucerne" is a very misleading one. One might as well ask for Australian wheat as Hunter River lucerne. It has been estimated that only 24 per cent. of the seed sold as Hunter River lucerne could possibly be raised in the Hunter River district, and, another thing, no notice is taken of the different varieties grown in the aforementioned district. The average yield of lucerne seed under favorable conditions is 12½ bush. per acre. Lucerne prefers a deep, well-drained soil. The roots go down to a great depth under favorable conditions (38ft. has been known), the main or tap root usually going down to permanent water, if possible. When planting this fodder the land cannot be brought to too fine a tilth, and must be carefully graded. The cost of grading at the outset pays many times over the extra cost of watering uneven and badly graded land. After grading and before planting the seed the land should be flooded, and as soon as it is dry enough to work, harrowed fine, and the seed broadcasted. The best way to cover is to run a light roller over after sowing. A small wave of earth precedes the roller, covering the seed to a suitable depth. Lucerne should not be planted more than ½ in. deep. A number of failures of germination have been traced to too deep planting. The advantage of flooding before seeding is that the seed germinates more promptly. If the seed bed is flooded after seeding the young plant has usually to force itself through a cake of mud, which too often beats it. In order to ascertain how much seed to sow, test a given number of seeds between two pieces of flannel for germination. This can be done in 24 hours. If the germination is good (say 95 per cent. of the seed shoot), plant 6lbs. per acre; if poor (say 50 per cent.), sow about 20lbs. per acre. As about 202,000 seeds go to the pound and there are

6,272,640 sq. in. to the acre, with good seed and given all seeds grow, one should get about one plant for each 5 sq. in. If planted thicker the plants only choke each other out. If it has had a good start it is better not to water lucerne again till the plant above the ground has quite shrivelled up. The longer it is left without water, provided there is some life in the plant, the better the tap root grows down and the sturdier the plant is as a result. In any case the plants should not be watered for six weeks after they have come up. If they get a flooding before the expiration of six weeks they get a set-back, from which they seldom recover for two or three seasons. After lucerne is established it needs watering after each cutting. It is advisable not to water freshly-cut lucerne when the sun is shining very hot, as the crowns get scalded and very often killed. The best time to sow lucerne is in the spring. Frosts cut the young lucerne badly and a nurse crop usually chokes it out. The best way of feeding lucerne is by silage. If used as a forage crop the stock usually damage the crowns by feeding on and breaking them. At a test at Jemalong, N.S.W., Mr. N. A. Gatenby fattened 75 sheep per acre during the hottest months of the year; 125 sheep per acre were kept from starving during the same period. Next to lucerne, sorghum is the best fodder plant, but it is run very closely by maize and the millets. Of the sorghums Early amber cane and Planters' Friend appear to be the best for general feeding purposes. The seed can be either broadcasted at the rate of 20lbs. per acre or drilled in at about 6lbs. per acre. When planted in spring, yields of up to 25 tons per acre are reported as having been secured. It is not considered advisable to feed sorghum to stock when the plant is flowering. The millets comprise a number of grasses ranging from the sorghums to the grass millets. Up to 10 tons per acre have been grown. White French millet appears to be the best, though the Pearl millet is a very good one. Sow about 7lbs. of seed per acre. Johnston grass belongs to the millet family. Maize is another very good fodder; 97 tons of green maize, horse tooth variety, was grown on one acre of land by Mr. H. G. Butterfield at Fulham. Other men have grown over 70 tons per acre in four months from planting. The usual way this is planted on the Adelaide plains, where it is grown exclusively for fodder, is to plant it in drills 3ft. apart and thick in the rows, about 40lbs. of seed being put in per acre. The land is cultivated between the rows as long as there is no damage caused by breaking the cane. A furrow is left, through which water is run after cultivation ceases. Very little evaporation takes place after the plants meet overhead. The disadvantage of maize is, it needs to be chaffed before being fed to stock; otherwise they waste such a lot of it. When chaffed stock will eat the whole of the plant. A large number of root crops make splendid fodders. Mangolds, planted in rows so as to allow for cultivation, have yielded 71 tons per acre. They will do well here under irrigation, but big results like the above are only obtainable in the cooler portions of the State. Sugar beet, swedes, &c., do well in cooler portions, but whether they will do here can only be ascertained by experiment. The same applies to kale, &c. Of the grasses there are several which are extremely difficult to kill out when once planted, viz., Johnston and couch grass. Both are good in their proper places. Of the other grasses *Paspalum dilatatum* is the best summer grass. The seed will lie in the ground for two years sometimes, till it gets the required amount of moisture and heat to germinate. It can be sown at the rate of about 5lbs. per acre, nearly any time except at mid-winter. Do not be afraid if it does not make a good growth, or rather germination, at first. It is nearly sure to come on. Some say it will kill couch grass and it is certainly easier to eradicate. It is a great robber, and it is not advisable to plant it near fruit trees. Toowoomba canary grass, *Phalaris commutata*, or Perennial canary grass, is the best winter grass, growing strongly during the winter months when hardly any other winter grass is growing. Stock are very fond of it. Sow broadcast from 1½ lbs. to 2½ lbs. of seed per acre. This grass grows very strongly and makes good hay, being upright in growth. If cut, it must be cut about 18in. from the ground, as there is very thick tussock near the root. Guinea is a good summer grass, somewhat like the *Phalaris* in growth. Sow about 3lbs. seed per acre. It is risky to plant. Rhodes grass is a good fodder, and is like a Giant couch grass, but it would be risky to plant it in the settlement. It is a summer grass, growing about 3ft. high. Several of the clovers, notably *Trifolium subterraneum*, are very good fodders and are worth while planting, as they improve the soil." In a discussion which followed the reading of the paper Mr. Everard said that *Trifolium subterraneum* was a splendid fodder to feed to cows with chaff. At the Dakota Experimental Station it had been estimated that the improvement of the soil effected by lucerne through the dying out of the lateral roots was worth six dollars per acre, and the nitrogen added was worth 35 dollars, making a total value of over £8 per acre added by a crop of lucerne. His hearers would have noticed the marked difference in the growth of, say, currants following lucerne. There was a man living below Waikerie who grew lucerne between his trees instead of cultivating them. He (the speaker) had once dug out a lucerne plant from near an orange tree and the orange roots were matted around the tap root of the

lucerne. In reply to a question, Mr. Everard said *Paspalum* could be planted at any time, but the present was the best. Mr. Waters said he had sown *Paspalum* with wheat, and there had been no sign of it when the hay was cut and not much until nearly 12 months from when sown. An Adelaide seedsmen had quoted *Phalaris commutata* seed at 10s. per pound, and had advised sowing 4lbs. per acre and at once. He had, however, thought autumn would be a better time. Mr. Everard agreed that autumn was a better time to sow. He had sown at Myponga in June and the *Phalaris* had done better than the wheat. It would stand plenty of water, and frost did not affect it. He had seen samples 7ft. 6in. high. It made a good hay, the stalk being fine but solid. A splendid grass he had noticed here was Prairie grass, which made excellent hay, having a fine and sweet straw. When using it himself he had chaffed it. It did not grow in summer, but kept green. He did not know of a winter-growing lucerne that was any good. Mr. Basey said he had a patch that did splendidly in winter, and was a good summer lucerne also. The seed was Hunter River, but he had not succeeded in getting it as good again. His thrived in winter when Messrs. Davies Bros.' alongside was quite brown. Mr. Everard said that weight for weight lucerne hay was as good as bran for cows. Mr. Waters said good lucerne patches had been common in the settlement years ago, but were very scarce now. For the decrease the custom of feeding off was probably responsible, though couch may have had a good deal to do with it. *Paspalum* would stand a fair amount of salt. Mr. Basey said that where lucerne was in terraces the last terrace almost invariably received too much water, so he intended to try *Paspalum* on the last terrace. He had found that it was unadvisable to water lucerne before cutting as a cut was lost thereby. Other members present seemed to be unanimously of Mr. Basey's opinion on the last point. Mr. Everard remarked on the fact that in old worn-out lucerne patches odd vigorous plants were generally to be found. Mr. Basey said the best way to renovate an old lucerne patch was by deep ploughing. He had done this with a worn-out patch he had purchased, ploughing it deeply and cross-ploughing it, to plant vines, and had secured a fine, thick crop of lucerne.

SPRAYING COMPOUNDS.—Mr. Cole said he had secured good results from spraying with tobacco wash for peach aphid. Some of his trees had been dying, but after treatment he had been unable to find a single live aphid, though there were millions of dead bodies. He had used 3lbs. of tobacco leaf and 2lbs. of soft soap to 20galls. of water, and had done the work thoroughly, spraying each spur individually. Mr. Waters said Sunlight soap made a good spray for aphides. He had used one cake of soap to 1½ galls. of water with great success for rose aphid. Mr. Waters said he had noticed a fly resembling the Rutherglen fly on currants recently. Mr. Basey said he had noticed what he presumed to be red spider on a pear tree. It looked like red rust, and the individual could hardly be distinguished with the naked eye. Only one tree was affected, and it did not appear to have suffered in any respect from the insect. Messrs. Basey, Cole, and others expressed the opinion that Bordeaux paste was a failure, and that there would be very little of it used here in future. Mr. Waters said it was no good for curl leaf, and if no better for oidium was certainly a failure. Mr. H. E. Olorenshaw had told him that he had sprayed three times with it, yet had oidium as badly as ever. This was on sultanas. He had seen one peach tree left where a patch had been sprayed, and no difference could be noticed. Mr. Everard said that he, on the contrary, had seen one that had been left and it was red with curl leaf, while the others were free.

Sherlock, October 7.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Osborn (chair), Parkin, Nock, Tonkin, Coombe (Hon. Sec.), and three visitors.

CONFERENCE WANTED IN PINNAROO DISTRICT.—The meeting passed a resolution that arrangements should be made to hold a Conference of Branches in the Pinnaroo district, with the idea of bringing the Branches into closer touch with one another and interchanging ideas.

Wilkawatt, October 7.

PRESENT.—Messrs. Ivett (chair), W. J., H. M., and D. Bowman, Harvey, O. and H. F. Ahrens, Gregurke, Brooker, J. E., J. W., and F. W. Altus, C. and T. Sorrell, Schulze, Ivett, F. and B. Speckman, Neville, Tylor (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. J. E. Altus. The machinery, buildings, and crops were inspected, and, considering the dry year, the latter were looking very well.

ANNUAL REPORT.—The late Hon. Secretary, in presenting his annual report, stated that 10 meetings had been held, with an average attendance of 13 members. During the year eight papers had been read, and three addresses were delivered, and a field trial of stump-jump cultivators was held under the auspices of the Branch.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, October 2.

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. S. Chapman (chair), T. Jacobs, C. Ricks, C. Lewis, J. Mildwater, J. Lewis, A. Broadbent, J. Brumby, H. Jacobs, A. R. Stone, J. Tozer, H. Lewis, A. Jacobs, E. Broadbent, G. Hicks, S. H. Curnow (Hon. Sec.), and one visitor.

CROPS.—Members reported the potato and pea crops to be healthy and vigorous. So far no sign of Irish blight was visible.

DISEASE OF FRUIT TREES.—Mr. A. Jacobs mentioned that through some cause the leaves of the Jap plums were withering badly, and the fruit and foliage were falling to the ground. Mr. Lewis said he had noticed the same trouble in the apricots, especially during the past three days.

INSECTS, USEFUL AND PARASITIC.—Mr. Jacobs tabled a mixed lot of beetles, including *Scarabæide*, *Elatæride*, *Buprestide*, and *Tenebrionide*. The family *Scarabæide* was represented by the five-horned dung beetle, *Onthophagus pentacanthus*, and *Onthophagus cereus*. Members considered them to be of great value on account of their habits of burying the droppings of animals and by this means manuring the pastures. The Hon. Secretary mentioned that he did not think the other specimens shown were injurious to any serious extent. The *Buprestide* as a family were mostly honey-eaters in the matured form, but the larva lived in the roots and stems of trees and in the rough bark of eucalypts. The *Elatæ*, or click beetles, come from wireworms, and the *Tenebrionide* included the mealworms; but the specimen tabled, *Amarygmus polychromus*, was quite harmless and one of the handsomest of the family. Mr. Stone tabled the larva, pupa, and adult of the strawberry beetle. This was one of the greatest pests the strawberry-growers had to contend with. The larva fed on the roots of the growing plant; the latter soon became sick and died. Mr. Stone mentioned that they were very numerous this season. The beetle belongs to the family *Scarabæide*. Mr. H. Jacobs tabled a small green *Paropsis*. The Hon. Secretary mentioned that as it fed on the leaves of eucalypts and was nowhere plentiful, it was comparatively harmless. The Hon. Secretary tabled several specimens of the *Carabide* family, including *Scaphophus australis*, *Calosoma shayeri*, *Scaphites crenaticollis*, and *Catadromus australis*. He claimed that all these beetles should be preserved wherever found; they were all insectivorous in their habits and were of use to farmers, &c. Several other smaller varieties were tabled, including a specimen of the apple root borer, *Leptops*, which belonged to the weevil family *Curculionide*. The following other specimens were tabled:—By Messrs. Ricks and Chapman, case moth; by Mr. C. Lewis, the larva of goat moth; and by Mr. A. Broadbent, dragon fly.

Clarendon, October 2.

(Average annual rainfall, 33½in.)

PRESENT.—Messrs. E. A. Harper (chair), Matthews, E. and F. Shiedow, Spoucer, Tester, A. H. C., and A. A. Harper, Piggott, W. H. and H. L. Morphet, and one visitor.

BREEDING AND RAISING STOCK.—Mr. E. Shiedow read a paper dealing with this subject, in which he said it was a mistake to use weedy stallions if useful farm horses were required. A good roadster would in all probability throw better stock. Care should be taken not to overstock. He had found that where land was timbered that the feed had not the substance in it that it had on clear land. He would, wherever possible, keep stock out of the paddocks during October, as the grass seemed to make headway in that month. Young horses would do better during winter if turned out and fed once or twice a day than if they were stall fed. Young stock of any description should not be allowed to get poor in condition. This applied specially to sheep and pigs.

Gumeracha, October 9.

(Average annual rainfall, 33in.)

PRESENT.—MESSRS. Porter (chair), R. and H. W. Cornish, Hittmann, Hanna, J. B. and W. B. Randell, Moore, Monfries, and Lee (Hon. Sec.).

TREATMENT OF CREAM.—Mr. W. B. Randell read the following paper:—"The feed that the cow receives has a great deal to do with the flavor of both the milk and the cream. The effect is more especially pronounced in the butter. In my 12 years' experience as proprietor of the Springton Factory I have found that cream from milch cows fed on kale, cabbage, or turnip tops is of a very bad flavor. In 1906 suppliers of cream in this district went in extensively for planting kale. I have not had such a bad season as that particular year. The butter went off very quickly, and the prices obtained were low. In order to ascertain the cause of the trouble I paid a special visit to five of the suppliers of the worst cream, and found, to my surprise, that these suppliers were feeding very heavily with kale. One of these undertook to leave kale out of the cow's ration for a week, and the cream and butter produced was first quality. I had to reduce the price of the milk from cows fed on kale 1d. per gallon. My conclusion is that kale and all kindred fodders are only fit for young stock and dry cows. The best fodders are mangels and good bran and chaff. Our German colonists feed first the mangel leaves and then the roots. Maize also gives good sweet cream, but lucerne has to be wilted for some hours before feeding to avoid tainting the cream or milk. Cows should be brought in from the paddocks gently, not rushed along the road, but treated so that by the time they arrive at the milking shed their body temperature is not much above normal. When hurried into the yard by dogs or impatient human beings the extra heat of their bodies affects the milk and seriously interferes with the keeping quality of the cream. During the milking operations the same gentle handling and patience must be observed. Keep the milking sheds and bails scrupulously clean, free from slush or dust, and well drained and ventilated. The walls and roof should be limewashed at intervals, and the floors swept after every milking. The use of a damp cloth to wipe the udder over so as to move the small particles of dust that adhere to it, and that will get into the milk and pass through the finest strainers, is necessary. The hands of the milker should be perfectly clean. If possible, the milking-shed and separator-room should be situated at a distance from all pigsties, and other places from which strong smells emanate. They should be built so as to allow of a good current of air passing through. Keep all milk buckets, separators, and receptacles perfectly clean. Wash out with boiling water and rinse with clean cold water after every milking and separating. Avoid the reprehensible habit of leaving the separator unwashed from one milking to the other, as the impurities that have been taken out of the milk remain in the bowl especially, and start to decompose very rapidly. A good rinsing out with lime water will kill all germs and keep all utensils sweet and clean. On no account run the warm cream into the previous separated cream, but into a separate vessel. When quite cool it can be well mixed with the previous separatings. One of the most frequent causes of cream arriving at the factory in an off condition is the neglect of this particular. The cream can should be kept in a cool, well-ventilated place: in fact, a cool current of air is almost indispensable to keep the cream sweet and free from bad flavors. A damp, close cellar or room is to be avoided, as a mould is almost sure to grow on the edges of the can and on the cream itself. Hang the cream out under a tree where a good breeze is blowing rather than in a damp cellar. Cans should not be too deep; the covers should be left off and a double sheet of muslin tied over the mouth. Milk cans or any utensil with narrow necks should not be used for cream. Immediately the cream has been separated it should be cooled down as low as possible. The best method is to use a Lawrence ripple cooler, and should you have a good well or spring handy, pump up a small tank full of cool water and pass through the cooler. The cooler will stand just under the cream spout, and while the separator is going the cream can be cooled down and run into the cream can at about 60°, thus being reduced quite 20°. Another plan is to stand the cream can in a cask or tub of cool water, but better still in a spring. Deliver cream as often as possible to the creamery in any case not less than twice a week. I have great sympathy for the man at the churn, as he has to deal with cream in all conditions; and to keep the reputation of his butter he is compelled to weed out the inferior cream and make it into second or even third quality. Of course, the suppliers are at once up in arms about the low prices and blame the manufacturer for all, while the blame should be placed on their own shoulders for either want of cleanliness or neglect in looking after the cream. Should you, through any unforeseen circumstance, be compelled to use any preservative, I can only recommend you to try, say, one teaspoonful of finely powdered saltpetre to a tea-cup of hot water; this is to be well stirred into the cream. This quantity will keep a 10-gall. can of cream sweet and wholesome, but will not, in any way, take the place of cooling down or

cleanliness. It is far better not to need any preserving drug of any kind, but the summer and hot, sultry nights may demand their use." In discussing the subject, Mr. Hittmann said his butter was tainted at this particular time of the year, in spite of the fact that everything was kept scrupulously clean. Members attributed the taint to the richness of the pasture, or it was due to the cows losing their coats, and their health and condition being affected by the greenfeed. Members did not think any harm was done by mixing warm cream with cold, but Mr. Moore strongly condemned the practice.

Hartley, September 27

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Wundersitz (chair), W. and C. Brook, Clark, Hudd, G. and T. Phillips, Symonds, Tydemann, Pratt, Richardson, Hill, Bermingham (Hon. Sec.), and 10 visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. Hudd, and an inspection was made of the property. The crop was rather backward, the weather being too dry, but with a little rain later on it was thought that it should be a fair average crop. Mr. Hudd had several acres of almond trees, some of them being four years old, which were loaded with fruit. The younger trees were coming on well. The flower garden was much admired, all kinds of flowers and shrubs were looking splendid, showing what an improvement could be made in the homestead with a little trouble. In the evening music and other social pastimes were indulged in.

Hartley, October 19.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Tydemann (chair), W. and C. Brook, Pratt, Hudd, Clark, Stanton, Symonds, Bermingham (Hon. Sec.), and 12 visitors.

VETERINARY ADDRESS.—Mr. Loxton, of the Stock and Brands Department, delivered an address on the treatment of diseases in horses, which was much appreciated by those present.

Longwood, October 7.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes, Vogel, Doley, Glyde, Roebuck, Furniss, Blakley, Nicholls, Coles (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. H. Vogel.

INSPECTION.—Members inspected the garden and noted the abundance of blossom upon pear and apple trees; also a fine growth of field peas and the luxuriance of the feed plots. They then discussed the different ways hillside gardens might be ploughed at the right time to have the soil exposed to the air and sun; how to lay the furrows to allow heavy rain to run away without washing; the necessity of harrowing or scarifying down fine by the end of October to prevent the soil from baking. It was said that many varieties of plums did not bear well and apricots were always a failure in these high altitudes.

SKINS AND PIPS.—Referring to item on page 103 of September *Journal*, members were opposed to any attempt to export refuse of fruit or anything which might lead to placing on oversea markets inferior fruit. What the growers needed was a market for fruit pulp.

Lyndoch, September 7.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), F. K. Warren, J. Mitchell, J. and R. Woolcock, G. and A. W. Lawrance, E. and H. Springbett, H. Schrader, H. Klauber, P. Burge, J. S. Hammatt (Hon. Sec.), and one visitor.

BEE-KEEPING.—Mr. J. Mitchell read a paper on this subject. "In the early days of the industry," he said, "bees were kept in what were known as box hives, which generally consisted of a jam case on its flat, with two or three cross sticks in the centre to hold the combs as they were built by the bees. When the honey was to be taken the box was turned bottom up and another empty box was placed on the top, and then a vigorous rapping was carried on on the side of the upturned hive, until the bees had travelled up into the empty box. Then the box containing the honey was taken away, and the one with the bees placed on the stand. This old style was always distasteful to me. In nearly all cases hundreds of bees were destroyed in the honey, and often the queen was killed, which meant that the swarm was ruined. Had not the present style of hives

been introduced, I should not have taken on the industry. It was in 1884 or 1885 that the bar frame hive was introduced as being a great improvement on the old box hive. The hive I have always used is known as the Langstroth, after the Rev. L. L. Langstroth, a German pastor, who introduced the bar frame. This hive has been the means of giving a livelihood to thousands the whole world over, for wherever bees are kept the bar frame hive will be found. There are many sizes of hives in use in Australia, but the principle is the same. It is advisable to have only one size of hive in the apiary, there is then no trouble in placing one on the other, or tiering up. I use tin strips turned at an angle for the frames to rest upon. I find that the bees are not so liable to be killed when the frames are being placed as is the case when the frame rests on the end of the box. I have tried several kinds of frames, some with closed ends, some closed part of the way, and those hanging free. The closed end frame is best for removing hives from place to place, as they do not require to be nailed. This is a great saving in many ways. If one intends keeping a few swarms of bees, it is advisable to first get the hives, frames, and other requisites and then the bees. If one intends making bee-keeping a means of livelihood, it is preferable to procure a few stocks and gradually work them up. I know of nothing that is calculated to drive a man to desperation more quickly than to have, say, 100 swarms of bees to look after in a good honey season without some previous experience. There is much to learn, and bee-keeping is not all honey. There are several species of bees, but those we are acquainted with here are the black bee and the Italian. There is a difference of opinion among beekeepers as to which of these is the best. I prefer the Italian. They are more quiet to handle and sit close on the frames when lifted out of the hive, and the queens are more easily found. The black bees are more excitable, and will run all over and often fall off the frames in clusters. In a good honey season there is very little difference in the quantity of honey gathered. The black bees are better than the Italian for comb honey, as their cappings are much whiter and give a better appearance. The queen bee is the mother of the swarm. The egg-laying is done by the queen, and it depends on the quality of the queen to a great extent whether you are successful or not. She is the swarm, and to be successful the swarm must be strong. There is a lot of difference even in queens reared from the same mother. Beekeepers are inclined to blame the queen for not keeping the hive full of bees, but forget that the bees have been for years working under high pressure and abnormal conditions, for as soon as the hive is full of honey the apiarist takes the honey that the bees have stored up against the future. This high pressure has a tendency to weaken the constitution of the bee, and the beekeeper often wonders why he does not get as much honey as he did formerly. Another very important inmate of the hive is the drone. The drone is to the swarm what the bull is to the herd, and it is very important that drones that are allowed to fly should be from the best queens in the apiary. This helps to make the type of bees better. Drones can be limited in the hives to a large extent by using full sheets of foundation neatly fitting in the frame; otherwise, if the bees are left to build any comb on their own it will be drone. I have used drone catchers, but have discarded them of late years. The worker bees are among the most energetic and industrious insects known. The quantity of nectar which the inmates of a strong hive will gather under favorable conditions is surprising. I have had as much as 60lbs. gathered in four days. Here I would draw the attention of beekeepers to a most important matter. Do not extract honey until it is ripe, that is, capped over. Complaints have often been made about the watery state of extracted honey. Many persons who used honey as an article of food complained when the extracted honey was introduced that it was not as good or as thick as the old box hive honey. This was true to a certain extent. The honey in the box hive was thoroughly ripe; perhaps the box had been full for weeks or months before the honey was taken away. The extracted honey was sometimes taken away before the comb was capped, consequently the article was thin and watery. The great advantage in using the extractor is that the honey is always clean and free from dead bees and brood. The old style of straining the honey through a cheesecloth strained it through all the impurities in the combs. The method I adopt when wiring frames is to drive a small wire nail through the ends of the frame about equidistant between the top and bottom bars. I then turn the nail into a hook, fasten the wire at one corner, go straight across to the other corner, then to the bottom corner, from top to bottom, and back to starting point. That crosses the wires in the centre of the frame and makes it strongest where it is most required. I have tried the style of threading the wire from top to bottom, but found that the holes made to draw the wire through were used by the wax moth caterpillars to get into the centre of the comb, where they did a lot of damage. I use a two-frame reversible extractor, and find it does the work satisfactorily. Of late years I have extracted all my honey, as I found that the comb honey was not so profitable. There may be some, however, who are keeping a few swarms

of bees for producing honey for their own use. It is very easy for such persons to have a few sections filled with comb honey, and I am sure there is nothing that looks better than a piece of nicely filled comb honey on the table. I have a frame which can be hung in the hive without trouble. It holds eight sections, and can be placed at the side of the hive. It will be noticed that the bees take a much longer time to fill the sections than to fill the open frame. Bees do not work in the section like they do on the larger frame; consequently I can take off 3lbs. of extracted honey to 1lb. of comb honey. Comb honey is very delicate, and requires very careful handling. A really good honey flow is required to get sections filled. I make my own foundation and use full sheets, and with care they last a long time. That bees are subject to diseases is too well known to be disputed, and there are not many beekeepers who have not suffered loss through disease. Bees in this district have been attacked by foul brood and paralysis, but as the subject of disease is so large I cannot deal with it here. A volume could be written on the subject, and anyone wishing to study the subject can get the latest scientific treatment of diseases of bees. The value of bees in the fertilisation of fruit flowers cannot be over estimated. Mr. T. W. Cowan, F.L.S., Chairman of the British Beekeepers' Association, in his pamphlet on the subject, says that the unfruitfulness of trees may be reasonably due to a scarcity of bees, and he quotes instances of orchards having proved unprofitable until a few hives were introduced. At the present time there are a number of beekeepers who shift bees from place to place. Sometimes there are forest trees in bloom at one place and not at another, and should there be a beekeeper in the place where there is a show for bloom a number of beekeepers will swarm in around him and spoil the season for the resident beekeeper and do very little good for themselves. The beekeeper should respect his fellow beekeeper, and not crowd any district with a lot of bees to the injury of those who are living in that particular place. When bees swarm they fill themselves with honey. After feeding bees very rarely attack, but when a swarm has been flying from place to place perhaps for a day, they are reduced to a condition of starvation. When you have a team of horses kept away from a hungry swarm."

Lyndoch, October 5.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), J. Mitchell, H. Kennedy, R. Woolcock, P. Burge, F. K. Warren, H. and E. Springbett, H. Klaube, W. H. Lawes, and J. S. Hammatt (Hon. Sec.)

VINE-GROWING.—Mr. A. Springbett contributed a paper on this subject—"My earliest experience of vineyard work," he said, "was amongst fairly matured vines. At that time all pruning was done with knife and saw, which would be thought a slow, tedious job at the present time. The vines were planted at distances of about 10ft. by 5ft. Later this was thought too close, and every other vine was pulled up, making the distance from vine to vine each way 10ft. Since then I have come to the conclusion that it would have been far better to have left things as they were, as I think 10ft. by 5ft. the best distance for the following reasons:—Firstly, the teams need only pass the one way through the vineyard, and 10ft. gives ample space for the dray to pass through without injuring vines on the side. In vintage time, if it is not possible to attend to the team oneself, a competent man should be put in charge. If the grape-picker is allowed to lead the horse on, broken vines may be the result, and what has taken years to build may be broken up in a moment. Secondly, the vines being 5ft. apart in the rows a good shade is given to the ground in summer. If the vines are planted 10ft. by 10ft. a lot of ground is exposed. Another reason, and a good one, is that having the vines closer together prevents, to a great extent, the blowing away of the leaves in the autumn, when they are falling. The more leaves that can be retained in the vineyard and ploughed under the better. They make, when decayed, a natural manure for the vine. When making preparation for planting a vineyard it is necessary to plough up the land a year before planting, and keep it well cultivated. The land will then be in good heart, and give the young vines a much better start. If the vines in the nursery are well rooted the first year so much the better. We found at Hillside Vineyard that a good way to prepare for planting was to measure off from the fence, or other boundary, the distance required for the first row. Then mark off 5ft. either side of the first row. Set up straight sticks in line, then with a good pair of horses and a good single plough, strike out the first land. It is necessary to have a 10ft. pole at each end to measure off the distance for the next strike out. Of course the line sticks have to be reset each time. When the whole block has been struck out, set the plough to the required width of furrow. If this is carefully done it will leave a nice width for

finishing when ploughing the land. A good plan then is to finish with another plough with the mouldboard off, ripping down deep where it can be done without turning the subsoil on top. For planting, get a good schnapper line or small wire and stretch across the furrows. Plant the first row to the line. Have a 5ft. stick at each end to measure the required distance. Shift the line the right distance for the next row. Two men can plant far quicker this way than they can plant in holes. One man takes the young vine, it having been previously pruned and its roots trimmed, placing one hand under it to keep the roots spread well cut, and places it on a small mound which has been prepared by the other man by placing a little of the top soil in the furrow. The vine is held in place until a few spadefuls of earth have been placed on the roots. The man holding the vine then treads the earth firmly down on the roots, and more earth to bring the surface to the required height is put on. It is necessary to leave two buds above the ground. When the whole piece has been planted plough back to the furrows, and harrow well. The soil will need occasional cultivating. When the vines have thrown out young shoots, a careful watch must be kept for the grub pest which lives under the loose soil by day, and comes out at night to attack the young leaves of the vine. I have unearthed as many as 40 from under one vine. It does not take them long to play havoc. The best way to deal with them is to mix about 1oz. of Paris green and $\frac{1}{2}$ lb. treacle with $\frac{1}{2}$ bush. of bran. This will do a large vineyard, as it requires very little scattered around each vine. The grubs take it readily, and they will be found by the thousands stretched out and limp. The next pruning season will be the time to start the formation of the particular shape that is required. According to whether the vines are to be gooseberry bush, or are for trellising. I do not intend to deal with pruning here, but may do so at some later date. Land is sometimes ploughed twice in the season, but this is too much in a large vineyard. One good ploughing is sufficient if the cultivator is run through two or three times. It is a good plan to get the cultivator through as quickly as possible after a heavy fall of rain, otherwise a hard crust will form, excluding air, and causing all the later rains to run off to waste instead of soaking down into the soil. Some plough the vineyard every other year, doing the rest with cultivator. The best is not being got out of the soil in this way. If land has been ploughed and well worked, the top soil is in a healthy condition through being exposed to sun and air. By ploughing this is turned underneath and the bottom soil turned on top, to be worked into a healthy condition by cultivating and to be turned under again the following year."

MacGillivray, October 10.

PRESENT.—Messrs. P. Wheaton (chair), Agnis, Petras, Stirling (sen.), Burfitt, Williams (Hon. Sec.), and three visitors.

SCRUB AND WEED CLEARING.—The Chairman read the following paper:—"The prevalence of bush and weeds on the farm is a question that needs the careful consideration of every landowner on Kangaroo Island. While the mallee is being killed there is a good deal of undergrowth in the form of bush and rubbish which it is necessary to be rid of, and after the land is considered to be cleared a lot of bush and weeds are constantly coming up. This applies to all land, from the best to the poorest, and was very noticeable in some parts this year. Paddocks that have been cleared of scrub for years carried a good crop of tobacco-bush, which appeared to come up after the heavy rains last February. When clearing new land, after burning the cut-down scrub, it is well to let the ground lie for a while after the first rains to allow the sulphur-bush and other seeds to grow. The young plants will then be killed by ploughing. The better the land the easier it is cleared of both mallee and bush, for there is a better chance of getting a fire over the stubble, and where cultivation and burning can go hand in hand the land is much easier cleared. On poorer soils one cannot always get a stubble burn, and often, when it is possible to burn, if it was done early in February, owing to shortage of feed, and trying to get the best use of stubble, the burning is left too late. Cultivation should then be resorted to. A good ploughing before the shoots get too high will help kill them and get rid of the undergrowth. Where a stubble fire will not burn it is of little use putting in another crop that year, and fallowing should be done as early and as well as possible. The difference in the growth of wheat crops on fallow and on ground only ploughed and cultivated, both sown at the same time, is very marked. After the land is fairly clean of shoots and the scrub undergrowth there are other bushes and weeds that need watching, among which are bluebush, sulphur, lemon and tobacco bushes, and agrimony; the last is the worst pest of all when once it establishes itself. It is general practice here to burn the grass every few years to kill the bush, and where the land is rough and impossible to cultivate, this is, perhaps, the best way of dealing with

the rubbish, but on country suitable for cultivation the fire should not be used too often. Most bush grows from seeds, of which there is a good supply lying in the ground ready to germinate when conditions are suitable. It is well known that in growing wattles from bark the seeds have to be soaked in boiling water or the ground where seeds are placed burnt before a good germination takes place. The same thing applies to bushes. Every time a fire goes over the ground hundreds of seeds are scorched, and become ready to germinate as soon as the rains come, and unless they are dealt with immediately they soon become as bad as ever. On light sandy soils where the bush is getting bad, instead of burning the grass it could be fed off, and the ground ploughed and sown with a crop to be fed off; the grass seeds are not destroyed, but grow better after the cultivating. It may be difficult to get harder ground ploughed before the rains come, and if ploughed after some of the grass seed would be lost. Having once got the land free from bush, either by burning or cultivation, the work is then to keep it clean, and for this a good sharp hoe will be found very useful. A man can cut over a lot of ground in a day if the work is done while the bush is small, and in this way the ground can be kept fairly clean." In discussing the subject members agreed that early rolling of scrub to allow shoots to start before burning off resulted in a quicker disposal of the shoot trouble. Stubble and shoots should be burnt together, as scorching the shoots in this way was more effective than cutting them off beforehand.

Meadows, October 9.

(Average annual rainfall, 34½in.)

PRESENT.—Messrs. G. Ellis (chair), Brooks, Catt, Kleemann, Nottage, and Bertram (Hon. Sec.).

REGISTRATION AND LICENSING OF DAIRIES.—The Hon. Secretary read a paper on this subject (see page 417, present issue). In discussing the paper Mr. Brooks said that while he agreed with the resolution carried by the Hills Conference in regard to this matter, he desired to point out that if the local inspectors of health had to visit all dairies in this district, and if he were paid at the rate of 7s. 6d. per day, it would not be fair to pay the amount from the rates. The Hon. Secretary thought the Government should place an amount on the Estimates to cover the expenditure.

Mount Pleasant, October 13.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. Giles (chair), Tapscott, Miller, Royal, and Maxwell (Hon. Sec.).

KNIFE V. SEARING IRON FOR LAMB-TAILING.—A long discussion took place as to which was the more humane method of tailing lambs. The consensus of opinion was that the knife was the more humane instrument to use.

CROPS AND STOCK REPORTS.—Although sorrel was somewhat abundant, on the whole crops were looking better than they had for years past. Stock generally were doing well. The rainfall to date had been 18.42in. since January 1st.

Port Elliot, September 23.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. Welch (chair), Chibnall, Brown, Green, W. E. and W. W. Hargreaves (Hon. Sec.).

SLUGS.—Members complained of the trouble caused this season by slugs and snails in wheat crops and amongst young vegetable plants. Mr. Green advocated putting sand round the young vegetables at time of planting. Other members recommended poisoning the pests with bran or sawdust and Paris green.

HORSE-BREEDING.—Mr. Chibnall read a paper on this subject as follows:—"When one examines the constitution and rules of the proposed horse-breeding societies, and analyses the conditions, it will be found that there is nothing to be gained by the breeder. For instance, if a farmer puts two mares to the stallion the cost would be £5 5s., equal to £2 12s. 6d. each mare, whether they proved in foal or not. The ordinary insurance is better than this. If there was a refund in case of no foal there might be some inducement to breed under the society's terms. As it now stands the man whose mares prove in foal and the owner of the stallion receive the benefit. Rule 13 states that the committee

may select a stallion of not less than 4 years old. I am quite sure it is impossible for any committee to select a stallion suitable to all the mares nominated, whereas if several stallions are travelling the district a breeder can use his own judgment. Successful breeding entails the selection of both the sire and the dam—in other points than mere size. More depends upon the selection of the mare than the horse. To improve the class of horse bred is to obtain a strain that has the power of transmitting its quality to its progeny. A special point to be considered in breeding is that for the production of a full formed, symmetrical, vigorous, and thrifty foal, the mare should be proportionately larger than the horse. An overgrown stallion of great power serving a small mare somewhat less in proportion than himself will beget her a strong embryo that will require more room and more nourishment than the mare can afford, and the result must be weakness, and probably deformity, and almost inevitably under-size in the foal, and probably the loss of the mare at foaling. During a course of years the farmers in the North of England to meet the demand bred their mares to the very largest stallion they could get, without regard to the size of the mare, expecting to get great, overgrown horses. The result was a lot of almost useless animals. I have noticed that if the mare is larger in proportion as a mare than the sire, the filly foals, that is provided they all have fair play, will grow into bigger horses than the colt foals. And this is what we should follow out if we wish to get a good, sound class of horse, for the reason, as I have already stated, the mare being larger has more nourishment and room for the foal whilst she is carrying it. This rule stands good in breeding any animal."

Uraidla and Summertown, October 9.

(Average annual rainfall, 42½ in.)

PRESENT.—Messrs. Hawke (chair), Curtis, Rowe, Johnson, Nicol, Pappin, Kessell, Cobbledick, Hart, Prentice, and Snell (Hon. Sec.).

GROWING EARLY CABBAGES.—Mr. H. Curtis read the following paper :—"The early spring variety of cabbage is a very important one if it is desired to have a useful vegetable fit for the market in the months of September and October when all other kinds of cabbage have gone to seed. This variety can be secured by getting different early varieties, saving the best of them for seed, putting them in a small bed in an open place, so that the bees can pollenate them, and, seeing that the varieties flower together, so that the seed will ripen together. If every care is taken in this way, a good strain will result. I have had one kind for nearly 20 years. How to procure early, strong plants, which will resist the attack of pests and the cold weather that they will pass through in the winter months, is an important consideration. It is necessary to select a plot on the sunny side of the garden and get it as clean as possible, by digging it over through the summer months frequently. Dig in plenty of old stable manure; clay land is the best if it is fairly loose; get the land very fine before sowing the seed. Do not rake the seed in deep. Cover it with some fine stable manure; if the land is dry water it well before sowing the seed; never sow before March. In autumn the plants, when they have the first leaf, are frequently attacked with black spot, which is similar to *fusicladium*, seen on the leaves of fruit trees in damp spring weather; if this is not treated it will kill the young plants, I have found the following solutions very useful—½ lb. ammonia dissolved in 3 galls. of water applied every three days, say, for a period of 12 days. I have also been successful in spraying with a very weak Bordeaux mixture, ½ lb. to 10 galls. of water. Never apply it in the heat of the day; rather in the evenings. Keep the plant beds clean of weeds by using slack lime and soot from the chimneys. In one month you should have strong plants. When preparing the land for the crop, select the cleanest, healthiest, land you have, preferably a piece catching the morning sun. If you have not got a suitable piece of land do not try to grow early cabbages, as you are wasting time and money. Use plenty of new stable manure if plenty of straw has been used for bedding the horses, also about 1 cwt. of bonedust to 300 plants. Use ammonia at the rate of about 1 cwt. to 1,000 cabbages when the cabbages are nearly ready for market. Always apply in liquid form. Plant the cabbages 2 ft. between the rows, 22 in. from plant to plant. Keep the surface well worked, and never hoe it deep. Do not cut before the greater part is ready, as the walking about will, if damp weather prevails, tread down the land and break any plants that are not fit to cut. This will have a tendency to keep your bed hanging about for months; otherwise if care and thought were exercised the bed would be cut clean in about a fortnight. When selecting your cabbages for the next season's crop mark the plants before cutting any from the bed. Cabbage heads should run up to a peak, should be dark green, have a fine leaf, and a small stump. When cutting leave at least two leaves on the stump, so

as to secure a full crown, or the stump will die. Delicate stumps often indicate good varieties. Take the stumps from the bed directly after cutting, and set them in your bed for the next year's seed."

Woodside, October 5.

(Average annual rainfall, 31in.)

PRESENT.—Messrs. Rollbusch (chair), Disher, Newman, Drummond, Johnston, Moore, Lauterbach, Keen, King, Keddie, Fowler, and Hughes (Hon. Sec.).

DAIRY COWS.—Mr. Rollbusch introduced this subject for discussion. He thought it profitable to weigh the yield from each individual cow at each milking. Heifers should be reared only from the best milkers. Members were of opinion that factories should purchase milk on test, and so encourage the keeping of cows yielding rich milk.

SOUTH-EAST DISTRICT.

Kybybolite, October 5.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), G. H. and W. Hahn, Lacey, Schinckel, A. R. Scholz, and C. H. Scholz (Hon. Sec.).

WEIGHING WHEAT IN BULK.—Mr. Hahn said weighing wheat over weighbridges was a good plan, but it would be necessary to test the bridge before weighing. Mr. Bradley concurred, but thought it would be impossible to have a weighbridge at every siding.

Lucindale, October 14.

(Average annual rainfall, 22½in.)

PRESENT.—Messrs. Rayson (chair), Secker, Carmichael, Beaton, Ferguson, Norsworthy, McMorrow, McInnes, Dow, Langberg, Copping, Johnson, Secker (Hon. Sec.), and one visitor.

BREAKING AND HANDLING HORSES.—A discussion took place on the paper read by Mr. McMorrow at the last meeting see September number, page 193]. Mr. McInnes thought it advisable to handle foals as soon as possible after foaling. Mr. F. Copping would let them run until they were rising 4 years old, when they would be properly developed and fit for work. Mr. Carmichael thought the suggestions of the paper-writer very suitable for the farmer-breeder, but to the person who bred horses extensively the ideas were impracticable. He believed in handling the foal when feeding the mare, as it tended to quieten it. Mr. McMorrow said handling foals at six months would be beneficial.

Millicent, September 26.

(Average annual rainfall, 28½in.)

PRESENT.—Messrs. Holzgreffe (chair), Gray, Hart, Serle, Bowering, Oberlander, and Day (Hon. Sec.).

KENTUCKY GRASS.—Mr. Gray stated that he had destroyed Kentucky grass by ploughing with a mouldboard plough about 2½in. deep. This should be done in very dry weather. Mr. Serle thought the seed in the ground would cause trouble, but Mr. Hart replied that it was easily killed when young, as it was a slow-growing grass from the seed.

MILK FEVER.—Mr. Geo. Serle contributed a paper on this subject as follows:—"The first symptom noticeable when an animal becomes affected is that she will stagger in her hind quarters and fall to the ground, and lie with her head to one side. If you catch hold of her head and pull it out straight she will draw it from you to the side again, as

though she had no power over her head. She appears to be half asleep. In the second stage she will lie stretched out as though she were dead. People sometimes use brandy and salts, but I find all these things a failure, especially in the last stage of the trouble. I use the sterilised air treatment, which is almost a certain cure. Good-conditioned cows which are good milkers are most frequently attacked, and the attack generally occurs either on the second or third day after calving." In the discussion which followed Mr. Serle explained that a cow's udder was a formation of flesh, and the fever caused the milk tubes to become stopped. The sterilised air treatment had proved successful in practically every case. It was important that a cow should not be milked for five hours after treatment, and not allowed to drink cold water. Milk fever was frequently caused by a cow being too fat before calving. Mr. Gray wished to know whether it was advisable to milk a cow before calving, but Mr. Serle recommended putting cows in forward condition in a sparsely-grassed paddock for a while. Mr. Holzgreffe agreed, and thought a little starving temporarily was the best in such cases. He had found this also applied to mares. He thought the sterilised air treatment very feasible. Mr. Serle explained that it was very important that a foal should have the first of its mother's milk. The treatment of mares would be different.

POTATO-GROWING.—The following paper on "Potato-Growing" was read by Mr. John Bowering:—"As the production of potatoes is increasing in our district, it is wise for us to inquire into the most profitable way of growing this article of food. The best soil for potato-growing is the volcanic, which is easy to work, and returns large crops. Next to this is peat country, with an admixture of sand, or what is known as black sand. Other lands follow in order according to labor expended for the return gained; and here I would remark that the best quality of potatoes, and those which keep longest when stored, come from the heavier soils. To prepare land so as to get the best out of it, plough in March or April, or as early as possible in the season, to a depth of from 6in. to 8in., and the oftener it is harrowed the better, weather permitting. The time for planting depends to a considerable extent on the position. The higher ground should be planted earlier than the low-lying country. On the higher land August and on the low land to the end of October represents the planting season. The most economical way of planting is dropping the tubers while following the plough, which should be set to turn a furrow 4in. deep. This will allow the seed to lay in broken ground, which I think is far better than dropping them on a hard bottom. The rows are usually 30in. apart, and sets 24in., but I am of opinion that the same number of sets in the row, with an increase of 10in. in the space between the rows would be an advantage, giving more room for cultivating between the rows while growing. There is another method of planting, and I intend experimenting with it this season. That is, drilling the seed in 30in. apart each way so that the cultivator can be run through the rows each way. This will leave the plant in a hill, with cultivation all round it. Cultivation when the crop is growing is one of the greatest factors in success. It is necessary to keep the ground stirred. The roots want air as well as moisture. Selection of seed is important, and is overlooked very often. 'What a man soweth, so shall he reap.' If you sow small seed you must not expect to dig big potatoes. Who selects anything but the best if he wants to keep up the best flock, or the best herd, or the best wheat? I think this neglect has degenerated some of the best sorts of potatoes, notably Brown's Rivers, and they are spoken of as 'run out.' Others will follow the same track if the culls are planted. Manuring adds materially to the profit in the crop. Farmyard manure is the best that can be used, but will give better results if the manuring has been done the previous season. If the manure is used with the planting the crop is liable to have rough skins, which makes the tubers look unsightly, and they would not sell so well as smooth-skinned ones. Gathering the crop, I think, is best done earlier than has been the practice of late years. Everything when it is ripe commences to decay, and the potato is no exception." Mr. Bowering referred to potato-growing in the Mount Gambier district. He recollected the time when heavy crops were obtained from new land, and planting was general in July. In later years farmers tried planting in November, but experience has proved that that month was too late. Mr. Holzgreffe said it was simply a matter of the season. He had seen potatoes planted deeply in splendidly cultivated land and fail. He did not favor deep planting, but moulding well was very important; in fact, he thought it impossible to overwork land for potato culture. Mr. Gray agreed that heavy land should be ploughed twice to ensure a heavy crop. Mr. Bowering stated that he had grown potatoes on all classes of land. He well knew the difficulties of working peat land owing to its blowing so easily in dry weather. He recommended lime, not as a fertiliser, but as a substance which compelled the soil to give all that was in it. He had experimented by attempting to grow a crop of perfectly round potatoes, but they grew all shapes except round. He thought

two crops in succession could be obtained from suitable new land. Mr. Holzgreffe thought it better to vary a crop on any land each year, as experts said that potatoes were great robbers of the soil. He had grown potatoes continuously for a number of years on a piece of land, but of course it was heavily manured and well worked. Mr. Gray tabled samples of four varieties of seed potatoes, being New Zealand Pink Eyes (early), Redskins, Snowflakes, and Adam's Prolific. He favored cutting Snowflakes to two eyes, but other kinds he recommended planting whole. Mr. Holzgreffe favored fairly large seed, and thought it did not pay to experiment with too many varieties. Mr. Bowering maintained that experimenting was necessary to discover the most profitable kind to grow. Mr. Holzgreffe thought a change of soil should have much the same effect as a change of seed. Mr. Oberlander considered the peat land would grow good crops without rain, as that class of land retained the moisture splendidly. In Germany, he said, it was the practice to cut the crown off the sets, that being the weakest portion and therefore the first to deteriorate. Mr. Holzgreffe inquired whether it is advisable to cut potatoes any length of time before planting. Members thought Redskins could be cut and planted the same day if in a dry situation.

Mount Gambier, September 9.

(Average annual rainfall, 31½ in.)

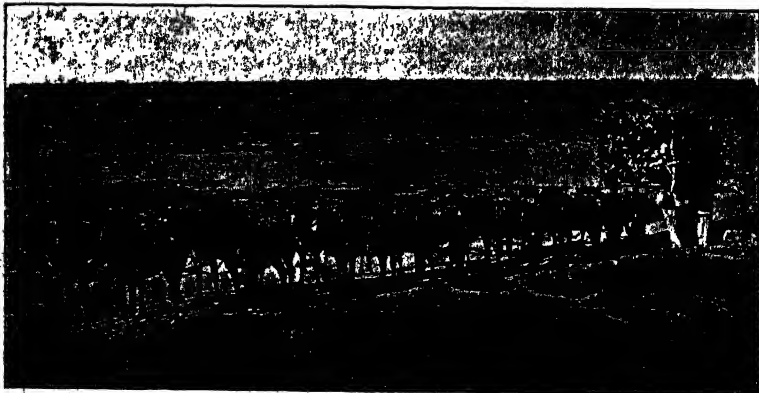
PRESENT.—Messrs. Wedd (chair), Dow, Ruwoldt, Sassanowsky, Major, Botterill, Pick, Smith, Ellis, Kennedy, Lunes, Wheeler, Holloway, Buck, G. and D. H. Collins (Hon. Sec.).

DAIRYING INDUSTRY.—The Government Dairy Expert (Mr. P. H. Suter) delivered an address, in which he said the dairying industry had made considerable progress during the last few years. Last year's production showed a considerable increase over the figures of previous years, the export surplus increasing on the previous year by 100 per cent., the figures being 1,760 tons, as compared with 837 tons in 1909. This increase meant £90,000 or £112,000 more than the three years before. There was great room for expansion of the industry. He was of the opinion that the farmers must take a keener interest in their business; many were too haphazard in their methods. He referred more particularly to their carelessness in breeding and feeding their dairy stock, to disloyalty to their co-operative factories, and to not fully recognising their responsibilities in the production of good dairy produce. Many delivered their milk or cream to the factories in bad condition. In regard to breeding, it was regrettable to find ignorance and carelessness rampant among a great number of the dairy folk. The result of this ignorance was that too many unprofitable cows were bred, and this discouraged those engaged in the industry. It was surely time the farmers woke up to this fact. He urged that attention should be paid to the securing of pure bulls from heavy milking ancestors, and that selected heifers from the best cows should be bred from. They should stick to one breed. The question of feeding was most important in successful dairying. He would even prefer to see the farmers pay more attention to feeding than breeding. Neglect of these two points was responsible for thousands of cows proving unprofitable. The cow was a milk-producing machine, and the greater the capacity of this machine the greater the profit if well fed. Exceptions would be found, because cows differed in the way they used their food, some producing milk and others beef. The latter were often easily recognised by the eye, but he would recommend monthly records of each cow's milk production. A cow on being proved unprofitable should be sent to the proper place—the butcher's block. Such cows were often the result of careless breeding, their sire probably coming from a beef-producing family. It must always be considered that profits from dairy cows depended on the conditions under which they were kept as regards food supply and general management. He had found in all districts that for several months the natural pastures were insufficient to maintain the bodily wants of the cow, much less a heavy flow of milk. This applied to the mid-winter and summer months. It was therefore important, in order to make dairying profitable, that more serious attention should be paid to providing for these times of scarcity. Shortage of food supply meant the loss of thousands of pounds annually. When the increased price of land and the cost of production were considered, it behoved all to practise the best methods of farming in order to secure an enhanced return per cow per annum. If provision were not made for careful breeding, feeding, testing, and co-operation, then he could not hope for the expansion of the dairying industry. Where dairy-farmers did not intend to improve in the growing of foodstuffs he would recommend lighter stocking. It was far more profitable to keep a few good cows and feed them well than to keep a lot of cows and only half feed them. Adequate feeding was required (1) to maintain the body system, (2) to nourish the young calf, and (3) to

create a liberal flow of milk. A cow giving $3\frac{1}{2}$ galls. to 4 galls. of milk a day had a very big strain on her system. It was important that the food supplies should be such as to stimulate milk supply, and also provide for bodily wants. Cocky chaff and straw were not calculated to make milk, and were not in themselves of much value, but fed with lucerne chaff, bran, crushed oats, green maize, &c., they were valuable in supplying nutrition absent in sufficient quantities in bran, oats, &c. A milking cow required daily from 28 lbs. to 30 lbs. of digestible dry matter, 12 lbs. to 14 lbs. of carbo-hydrate, $2\frac{1}{2}$ lbs. of protein, and 1 lb. of fat. These ingredients were present in varying quantities in most foods, but protein was most often absent. It was found that leguminous crops were rich in this, especially peas, lucerne, beans, and the like. There was also a high percentage in bran. These could be used as milkmakers. The ration fed should always be of a palatable and succulent nature. The succulence created a healthy and vigorous secretion of the natural fluids of the stomach, and this prevented dry bble, &c. In the Mount Gambier district the bran bill could be saved by growing lucerne. Lucerne hay was worth the same for feed purposes, pound for pound, as bran. Bran cost £5 per ton, and lucerne £2 to £2 10s. The man who used bran was foolish when he could grow lucerne. Lucerne or bran was worth 10 to 20 times as much as maize or oats hay. Dairymen should fully understand food values, because they were foolish to buy food supplies when they could more cheaply grow foods of equal value. Although there were many equal, yet there were not better districts than Mount Gambier for dairy purposes during the next three months. The pastures were equal to providing a heavy milk supply, and the soil had the necessary protein matter. A cow would consume 100 lbs. to 120 lbs. of grass per day, and compared with this maize would be sorry food. He would strongly recommend them to grow lucerne; it was not necessary to go into details as to the method. On the experimental farm he had an area from which he was cutting 70 tons of lucerne to the acre per annum. For winter feed it was usual to grow barley and oats. He would recommend them to try Berseem, or Egyptian clover. This was introduced by Professor Perkins. It was similar in appearance to lucerne, but was an annual. Some six weeks before he had seen it growing at Roseworthy College, and it looked like going 12 to 14 tons to the acre. If it only went 8 to 12 tons it would recommend itself. In Egypt it went 5 to 6 tons. If it proved as valuable as it promised Professor Perkins would be looked upon as a benefactor to the State. Laying down special grass pasture was an expensive matter. It would be better to pay more attention to improving natural pastures than to lay down rye grass or clover. He had recently seen *Phalaris communata* 15 in. high, and he knew nothing better for winter feed. Thousand-headed kale, mangolds, swedes, &c., were good, but they meant considerable expense. He preferred mangolds. It was advisable to cut them up about 12 hours before feeding, and mix them with chaff. This allowed slight fermentation. He had learned that Mr. G. Riddoch had increased the carrying capacity of his land by 100 per cent. by manuring the natural pasture, while artificial pastures laid down had soon run out, and did not pay. The southern portion of South Australia contributed but a small proportion of butter for export when its area and facilities were considered. Some of its produce was good and some bad, the latter possibly due to some taint in the pasture at certain times of the year. Mount Gambier possessed the best district in the State for dairying. The backwardness of the industry might be caused by the scarcity of labor and the fact that onions and potatoes grew so well. He was sorry the potato blight had come into the district, but he was positive they would get the best returns and make the value of the land best by dairying. This had been the experience of farmers at Warrnambool. They would find that dairying would bring in just as much money and would keep up the value of the land, and in the future they would look back and feel almost glad that the potato blight had come. With energy there should be an immense increase in dairy production in the district. They had too many small rat-trap factories in the district. It was hard to have to say this. If they were to close up three, four, or five, and establish two or three central establishments east, west, and south, they would be able to handle more stuff, pay higher wages, have lower costs, and the farmers would get a better price for their milk. They might co-operate or amalgamate, or buy the other factories out. If they co-operated loyally it would do away with local jealousy, because there was always some feeling between rival factories. The price for milk was not too high, and amalgamation should increase it. He and those interested should strongly oppose the idea of establishing more factories. If 10,000 acres more of land were thrown open, then those interested should move heaven and earth to prevent the establishment of another factory. More attention should be paid to the quality of produce. Some of the supplies sent to the factories were faulty. The farmers did not fully recognise their responsibility in the production of butter. Taint in butter was often due to filthy conditions in the milking yard. No factory manager could make good butter or cheese

from a faulty material. Some hundreds of tons of good butter were spoiled by faulty supplies. Shareholders should give more loyal support to the managers of co-operative factories. Mr. A. A. Sassanowsky asked if Mr. Suter could recommend a suitable and cheap building for a milking shed, about four bails. Mr. Suter said it would be necessary for him to supply the Bureau with plans. It was necessary to comply with the Act. For a small herd of 20 to 25 cows three bails would be sufficient. There should be good drainage, free access of air, which was a great purifier, and a good floor. It was best to have this of brick or concrete, and make a good job of it. Some had doors at the front of the bails to let the cows through, but he did not like this, as the cows were not seen again, and might be let out only half milked. Drainage, good floors, and ventilation were the main things. He would not recommend asphalt, for where the sun got on it, it became soft and was cut up. In reply to Mr. Ruwoldt, he said red gum blocks made a good floor, but absorbed the moisture, and became offensive. Mr. J. Botterill said they only needed to move about the district to see that the question of breeding was neglected. The bulls were a nondescript lot. He agreed with Mr. Suter's remarks so far as feeding was concerned; the people expected to get the maximum of milk from the spring grass, and during the other part of the year did nothing. Mr. A. A. Sassanowsky thought that if farmers were going in for dairying they should go in for that alone. He did not believe in mixed farming. Now that a good oversea market had been opened up he thought the farmers could do well at dairying.

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CARTING FIREWOOD IN THE INTERIOR.

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All communications to be addressed:

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Permanent Inspectors of Orchards, Chaff, and Fertilisers.

The Director of Agriculture recently called for applications from persons competent to fill the above positions. In the reorganisation of the horticultural branch of the Department it was recommended that five permanently employed inspectors be appointed to carry out the requirements of these Acts throughout the country and suburban districts, instead of about eight temporarily employed officers, who were engaged a portion of the year only. A large number of applicants applied for the positions, which carry a salary of £156 per annum with an additional £150 to cover all travelling expenses. The applications were narrowed down to 13, and subsequently 12 of the applicants sat on November 21st for a written and oral examination in practical knowledge of orchard work, elementary entomology, and pathology. One of the positions had been given to an officer on the staff; the four successful applicants were Messrs. R. Fowler of Coonawarra, G. L. Wishart of Angaston, H. J. Darwent of Coonawarra, and C. H. Beaumont, late of Pen wortham. All of these gentlemen have owned and worked orchards of considerable extent and possess a good knowledge of horticultural matters. Messrs. Fowler and Wishart have been employed on the temporary staff as inspectors of orchards for several years past. In recommending these applicants Mr. Quinn pointed out that all being comparatively young, well-educated men, it is to be expected that after a few seasons' practice they will become competent instructors, whose advice will be valued by the fruitgrowers. It is intended to divide the State into five inspectorial districts as follows:—No. 1—South-Eastern (from Bordertown south); No. 2—Southern (all country south of the overland railway line and west of the River Murray); No. 3—The Adelaide Plains and north as far as Gawler River; No. 4—North-Eastern (all country north of the overland railway line to Gawler River, Williamstown, and Swan Reach on River Murray); No. 5—Northern (all fruit-growing country from Williamstown and Eden Valley northwards through Angaston, Nuriootpa, Tanunda, Kapunda, Riverton, Watervale, Clare, Wirrabara, and Beetaloo Valley).

Prohibition on the Removal of Potatoes.

In a proclamation issued on November 23rd the removal of potatoes was prohibited from the counties of MacDonnell, Robe, and Grey, with the exceptions of the hundreds of Mount Benson, Bowaka, Ross, Waterhouse, Bray, and Smith. unless each and every consignment of such potatoes is

accompanied by a certificate signed by an inspector under the Vine, Fruit, and Vegetable Protection Acts, stating the origin and destination of such potatoes, and declaring that they were examined by him and found to be free from the fungus disease known as Irish Blight (*Phytophthora infestans* of De Bary). This proclamation places the South-Eastern potato-growing areas, with the exceptions named, upon the same footing as those within a certain quarantined area near to Adelaide, which embraces practically the whole of the counties of Adelaide and Hindmarsh and much of the county of Sturt. Arrangements will be made with the Railway Department whereby its officials shall refuse to accept for transport any potatoes from within these South-Eastern counties unless they be accompanied by the necessary certificates.

Morning and Evening Milk.

According to an investigation described in a report of the Durham University Philosophical Society, the difference in butter-fat content of morning and evening milk is entirely due to the variation in the hours of milking. On the average, if a herd be milked 12 minutes earlier in the morning and 12 minutes later in the evening the milk will be richer in fat by 0.1 per cent. in the morning and correspondingly poorer in the evening. Where cows were milked at 6 a.m. and at 3.30 p.m. the evening milk was richer by 1.09 per cent.; but where there was just 12 hours between the milkings, the cows being milked at 6 a.m. and 6 p.m., the morning milk was richer by 0.18 per cent.

Prospects of the Honey Season.

Mr. T. E. Whitelaw, Inspector under Foul Brood among Bees Act, reports—"Apianists generally have resigned themselves to the fact that the prospects for the coming honey yield are not encouraging. Last season the buds of the various eucalypti were plentiful, more especially the red gum (*E. rostrata*), but the adverse weather experienced prior to January spoilt a promising outlook. At the present time the state of affairs is to some extent reversed. The buds are not showing well, while the atmospheric conditions are more hopeful. In a few portions of the State a fair honey flow is anticipated, while in others an 'off season' is a certainty. In seasons such as this one promises to be the thoughtful beekeeper will show prominently as a honey-producer—the man who keeps his bees going by judicious feeding in the earlier parts when nectar is scarce, and then brings his hives to the pitch of their strength as the honey flow commences—it is he that will make the best of a moderate flow. It is very essential that the exportation of honey should be maintained during the 'lean' seasons, and it is at these times that

the industry by concerted action should see that the clients in other countries are fully supplied, so that when the 'glut' arrives an outlet is at hand, by means of which local markets are preserved from stagnation. It is an undoubted fact that the honey export trade developed by the Government Produce Department could be increased to an almost unlimited extent if a continuity of supply was ensured year by year."

War and the Wheat Market.

Commenting on the effect of the Turko-Italian war on the wheat market, *Broomhall's Corn Trade News* states—"A state of war between any two important nations always has an exciting influence upon the nerves of all concerned in the growing and handling of wheat; therefore, while the war lasts and, perhaps, even a little longer indeed, we would almost go as far as to say until the entire Eastern question is very much nearer to a state of settlement than it appears to be to-day, the wheat market may remain in a nervous condition and liable to irrational and unexpected fluctuations, so so that it behoves all concerned to move with more than the usual degree of caution."

Pear Leaf Gall Mite (*Phytoptus pyri*).

A number of specimens of leaves attacked by this pest have been submitted to the Horticultural Instructor (Mr. G. Quinn) for identification recently. This little mite is said by authorities to secrete itself under the scales which enclose the winter buds on the pear trees and thus hibernate over the dormant season. When the young leaves begin to unfold the pest mines through the epidermal wall of the lower surface of the leaf and an irregular gallery in the chlorenchym-bearing tissue between the lower and upper skins of the leaf. At first these have the appearance of reddish swellings, and if dissected under the microscope the mites are fairly easy to locate. As the injured areas increase in age the tissue dies and turns very dark-brown in color, giving the leaf an appearance which is sometimes mistaken for the injuries inflicted by the fungus disease known as black spot (*Fusicladium dendriticum*). This little mite does not attack all varieties of pears alike. One of the kinds principally attacked is the Williams' Bon Chretien, frequently called "Duchess" in this State. It does not appear to inflict dangerous injury upon the tree attacked, as only the tunnelled portions of the leaves seem to perish. As far as remedies are concerned a thorough spraying of the affected pear trees with kerosine emulsion just as the brown scales begin to open from the winter buds is said by competent orchardists to mitigate the attack to a very appreciable degree.

Australian Wheat Crops.

Referring to the prospects of the wheat crops in Australia, *George Broomhall's Corn Trade News* of October 17th states—"Some good authorities have sharply reduced estimates of prospective outturn, owing to insufficient rain, and our own agent has cabled that a good general rain would be beneficial. It is putting the matter very mildly to say that these reports have come as a great surprise to the trade in this country because, as far as one could judge from the cabled reports, the rainfall has been almost constant and the amount of precipitation very fair. If it should turn out that the crop has been sensibly reduced, it would afford one more illustration of the uncertainty of wheat-growing in hot countries, and prove how very easy damage results when rains hold off for any length of time. In the meantime we can still report very free shipments of old crop and continued sales of new."

Compulsory Fumigation for Red Scale.

At the request of a large number of the principal orange-growers in the Torrens Valley, the Government some time ago decided to not only make this method of treatment for the red scale compulsory, but to perform the work for those who did not possess the necessary outfit or who refused to hire someone else to do the work. The plan has now crystallised into action, and in response to advertisements Mr. J. White—who was working foreman for Mr. E. P. Elliott's fumigating outfit for a couple of years—has been appointed foreman of the first outfit. The plant is now being got together, and is to be made as complete as possible, as the Horticultural Instructor, under whose direction it will be operated, is determined that the best work shall be done. In the meantime the Inspector of Orchards for the Adelaide Plains has been instructed to begin with the Hackney and St. Peters portion of the eastern suburbs, making a garden to garden search for citrus trees upon which this pest preys. Each owner of such affected trees will be served with a notice to fumigate within a time stated, and he may do the work personally or hire others to perform it within the specified time. Failing this the Government plant will move along and do the work and the cost be made chargeable to the owner. The alternative will be the removal of the trees. The foreman of the fumigating work is accompanying the inspector in his initial visits and quoting prices to the owners at which the trees in the different gardens will be treated. It will be well for occupiers of gardens in which scale-infested citrus trees are growing to know the Government has power to recover the cost of this work, and that the cost may be reduced in proportion to the size and accessibility of each tree and the freedom from weeds and plants on adjoining soil. Those persons possessing useless or worn-out trees would be well advised to remove and destroy them without delay, as in no case will a red scale infested tree or shrub be left behind untreated.

Advertising South Australia.

In a report dealing with exhibits of South Australian produce at the Grocers and Allied Trades Exhibition held at Newcastle-on-Tyne in October last, the Acting Trade Commissioner states—"I am convinced that these provincial exhibitions are excellent media for advertising our products, and equally excellent as a means of publishing the details of our emigration system. I propose to arrange that also at all future Shows the advertising of our emigration system be made a feature. . . . I have no doubt whatever that with the exhibition of our products, the distribution of literature, the verbal information supplied, and the press notice, that the thousands of visitors to the show and Newcastle and the surrounding districts have obtained an illuminating and probably indelible impression of South Australia as a wonderfully productive and desirable country."

Shipping Space for Export Fruit.

Judging from the discussion which ensued at the recent Annual Conference of the Victorian Fruitgrowers' Association, exporters in the sister State have not experienced the difficulty in securing space for fruit on vessels trading to oversea markets to the extent South Australian growers have. As the result of a request for a definite opinion from the Conference as to the Department of Agriculture endeavoring to secure the whole of the export space for fruit, the following resolution was carried :—"That inasmuch as very many growers are satisfied with the facilities afforded by agents for shipping to oversea markets, this Conference is of opinion that there is no general demand for the Government to secure control of the whole of the shipping space, but would heartily support any action that is taken to secure space for any growers that desire it."

Red Spider.

"The most frequent complaints received from horticultural correspondents during the month," writes Mr. G. Quinn (Horticultural Instructor), "has had relation to the foliage of the trees, more particularly that of the apple, almond, and plum, turning a pale, rusty appearance and looking very sickly indeed. When these correspondents have sent along specimens of the affected parts only a very cursory examination was needed to reveal the presence of myriads of these small red mites, which are usually known under the general name of 'red spiders.' It is extremely doubtful if only one species, or even genus, is represented amongst those doing injury here, and a field for investigation is certainly presented for those who are of a scientific turn in relation to these vegetable-destroying forms of the Arachnoidea. The small, bright red eggs-

of this pest are found thickly clustered in the crinklings of the bark, more particularly upon the medium-sized and small limbs. This is the stage in which the winter months are passed when the trees are leafless. With the advent of early summer a proportion—fortunately often only a small portion—hatches, giving rise to the small red mites, which are at first only possessed of three pairs of legs, but afterwards develop another pair. This is one of the structural differences separating them from the true insects. Their presence is sometimes not suspected until the yellowing of the foliage above referred to takes place, when the pest has assumed countless proportions. The best remedy found for this pest is to spray the trees thoroughly when bare in winter with an emulsion of red oil. Sulphur is, when oxidised by moderate heat, the sovereign remedy against these mites if the plant attacked is in a house; but in the open the trouble has always been to apply the sulphur satisfactorily. Kerosine emulsion, soft soap, and the old English remedy, known as Gishurst's compound, have been recommended as satisfactory specifics when the foliage is upon the trees, but the writer has no personal knowledge of their value in this connection, although the first named, if properly compounded, should destroy the mites without causing injury to the trees. Experiments in dusting almond trees with flowers of sulphur during hot days by means of a bellows have been undertaken and the results will be available at a later date. Protracted spells of dry hot weather most certainly favor the breeding habits of this pest."

West Australian Wheat Yield.

According to figures supplied by the West Australian Government Statistician, the wheat yield for that State is estimated at 5,146,996bush. from 559,110 acres, an average of 9.2bush. Last season the return was 5,897,540 bushels from 581,862 acres, or an average of 10.1bush. The decrease in the yield as estimated is stated to be owing to the fact that in several of the newly-settled areas, comprising over 74,000 acres, the crops, owing to drought, are a total failure.

The English Meat Market.

Writing under date London, October 27th, the Trade Commissioner (Mr. C. F. G. McCann) reports that the prices ruling for meat in the Smithfield Market were extremely depressed and the demand very limited. He, however, from very careful inquiries made, was led to believe that there were better prospects for prices ruling at the time of arrival of the bulk of South Australian meat, as it was estimated that stocks of home-grown and Dutch meat may be at that time almost exhausted.

Attention to Young Trees.

Many kinds of fruit trees, more particularly those between one and three years old, may be scrutinised with advantage at this time of the year. It will be found in respect to the former that one or two shoots from the main stem are making greater progress than the others and the balance of the crown of the tree is in consequence jeopardised. Such ascendant shoots may have their tender points pinched out, just taking away about two partly unfurled leaves, but not down low enough to reach toughened fibrous tissue. Several such pinchings during the summer will often equalise the heights of the main limbs. Apricot, peach, and plum trees (two or three years old) which are yet in the process of developing their framework should not be permitted to grow any large woody limbs up in the centre of the head. If such are allowed to remain past mid-summer they stifle and devitalise young laterals, which would otherwise become useful bearers of fruit in the course of a season or two. In the apricot these should be shortened back to about 6in. to 10in. just after the fruit is plucked; but in the peach, providing other good shoots are present, many may be absolutely suppressed. Those shortened on the apricot will under most conditions send out healthy, short, fruit-bearing shoots which may ripen sufficiently to bear a crop the next season. This remark also has special application to strong wood shoots, which on the apricot often arise from main limbs in the interior of the tree in close proximity to where a large wound has been made when pruning. If such rank shoots be allowed to remain until winter and then receive pruning treatment they invariably start again into very rank growth, essaying to compete with the legitimate leaders of the tree.

Protecting the Fruit Industry.

Various American States go to what, even in advanced Australia, would be considered extremes in protecting their rural industries against damage by unscrupulous practices. Many complaints have from time to time been made against the injury to the Florida orange industry resulting from the shipment early in the season of green, immature fruits. The following enactment by the State of Florida is attracting attention in the fruit industry in America:—
“That it shall be unlawful for anyone to sell, offer for sale, ship, or deliver for shipment any citrus fruits that are immature or otherwise unfit for consumption, and for anyone to receive any such fruits under a contract of sale, or for the purpose of sale, or of offering for sale, or shipment, or delivery for shipment. This section shall not apply to common carriers or their agents who are not interested in such fruits, and who are merely receiving the same for transportation.”

"Some Sort of Currants."

A writer in a London publication, dealing with the currant industry, states—"It appears that the heavy protective duty of £28 per ton, equal to more than 150 per cent. on the prime cost, levied by the Commonwealth of Australia, is fostering the production of some sort of currants in the States of Victoria and South Australia, and this accounts mainly for the restriction of the importation of the Greek article." Commenting on this statement, the Victorian Government Viticulturist in an article in the November issue of the *Journal of Agriculture*, Victoria, writes—"Seeing that a sample of Angaston (South Australian) currants equal to Mildura standard (Three Crown) were valued in London some three months back, when prices were not at their best, at 40s. per hundredweight, they are surely worthy of being described as something better than 'some sort of currants.'"

Suckers in Fruit Trees.

Some kinds of trees, more particularly plums and peaches, worked on other than peach stocks have a tendency to send up suckers or offsets around their stems from the stock plant and if not quickly suppressed these sap the vitality of the grafted portion and form new channels, which not only absorb the crude sap sent up from below, but appear to close or crush out free connection with the top or stem of the tree proper. Such suckers are robbers, and need to be suppressed close to the parent stock. The best plan is to open the soil with a spade and cut them away deeply; that is, well into the bark of the spot from whence they emerge.

Imports and Exports of Plants.

During the month of November 12,470bush. of fresh fruits, 669pkgs. of cucumbers, 5,345 bags of potatoes, 349 bags of onions, and 2pkgs. of plants from inter-State markets were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act, 1885; 1,162bush. of bananas (chiefly over-ripe) were destroyed. At Mount Gambier 40 cases of fresh fruits were likewise admitted from Victoria. Under the Federal Commerce Act 2,535bush. of fresh fruits, 26pkgs. of dried fruits, 60pkgs. preserved fruit, and 48pkgs. peas were exported to oversea markets during the same period. These were distributed as follows:—For London, 48pkgs. peas; for India and East, 60pkgs. preserved fruit and 1pkg. dried fruit; for New Zealand, 2,484 cases citrus fruit, 25pkgs. dried fruit, and 51pkgs. cherries. Under the Federal Quarantine Act 6,843pkgs. plants, seeds, bulbs, &c., were admitted from the oversea sources.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the enquirer must accompany each question. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

UNPRODUCTIVE QUINCE TREES.

"P. L.," Tatiara, writes—"I planted some quince suckers eight or nine years ago, and although they have grown well and are remarkably healthy, they have not yet bloomed or borne fruit. Can you explain?"

Answer—These trees, being raised from suckers, are most likely barren, and may never fruit, as such instances are known. Why not bud or graft them over to kinds known to bear freely?

NON-SETTING OF FRUIT ON PLUM TREES.

"P. L.," Tatiara, writes—"I have several plum trees, and for the past three years they have bloomed profusely, but no fruit sets. I shall be glad to have some advice on the matter."

Answer—If these trees have fruited previously to the period named, try pruning some severely, which will most likely force strong growth and prevent profuse blooming for a season or two. Root prune others by opening a trench around them and severing a number of the largest and more vertical roots, filling the trench in with a good compost of soil and manure, either farmyard or bonedust.

PLANTING APPLE TREES.

"Beetaloo Valley" asks—"Will apples do better if planted in blocks of one variety, or is it advisable to mix the varieties when planted?"

Answer—It is generally conceded that rows of different varieties of fruit trees which bloom simultaneously should be planted in close proximity rather than that complete blocks of one variety be set out. For instance, Dunn's Seedling, Cleopatra, and Jonathan agree to these conditions, while Rome Beauty is of no value to the above kinds for cross-fertilising purposes. It is not desirable to plant odd trees here and there, but, say, two rows of each variety, as this facilitates spraying, picking, &c.

REPAIRING UNDERGROUND TANK.

Mr. G. V. Birks, of Port Lincoln, is a reader of the *Journal* who likes to tell a good thing when he knows one. Referring to a question asked in a previous issue as to the best means of repairing an underground tank, he writes—"I recently came across one that had been satisfactorily repaired after years of wasteful leaking. The cracks in the cement were cleaned out, and the larger ones filled up with stiff mutton fat, then all the cracks tarred over and sanded, and after standing for a day or two another coat of coal tar and fine sand applied. The result was highly satisfactory."

DEODORISING BLOOD.

"G. M.," Port Lincoln, asks—"Which is the best way to handle blood in its raw state from slaughter yards? Can it be mixed with any chemical or other substance to take away the smell?"

Answer—Probably the best way to handle blood to get rid of the offensive smell to a great degree and yet retain its manurial value is to make a compost of soil and superphosphate, adding the blood, and thoroughly mix it all up. This will not, of course, reduce the offensive smell in anything like the same degree as manufacturers do in drying the blood, but it will make a very useful compost for the farmer to apply to the land.

THE TREATMENT OF CREAM.

"Blocker" asks—"When is the best time to separate milk, and at what temperature? What is the best method of treating cream to be sent to the city?"

Answer—The sooner the separating can be done after milking the better, as the condition of the milk is at that time most suitable. The temperature should be from 88° to 92° Fahrenheit. If the cream is to be forwarded for the manufacture of butter, the first essential is to see that cleanliness is strictly observed at all times, right from the feeding of the cow to delivery of the cream. Before running the cream into a can rinse it out with lime-water, of course having previously scalded the can out with hot water and washing soda. Separate if anything a little thicker in summer than in winter. Aim at securing a return of 1lb. of butter from 2lbs. of cream forwarded. Should the cream be of poor consistency, or thin, then it contains too much milk, and thus supplies a great quantity of food for the germs to feed upon, and hastens acidity or souring of the cream. Do not mix each morning's and night's cream together until they are within a degree or two of the same temperature. Bad cream means bad butter. Keep the cream in the coolest possible place. Sew bagging around the cream can and keep it wetted, giving the cream a stir about the middle of the day and again at 9 o'clock at night. Do not use any so-called preservatives in the cream; the only true and safe ones I can recommend are strict cleanliness, coolness,

a little salt, and early delivery to the factory. Forward cream not less than three times weekly during the summer months, and not less than twice weekly in winter. Every second day would secure better prices. Mix well all cream just before forwarding to the factory, taking care to see that the cream can be protected from the fierce sun by being wetted and covered with wet bags, over which is erected a foot high a sheet of stout white calico to create a cool draught during transit. Butter from cream treated in this way should command 2d. to 3d. per pound more than that supplied to factories by many careless, dirty, and indifferent suppliers.

STOCK INQUIRIES.

(Replies supplied by the Government Veterinary Surgeon.)

BLINDNESS IN COWS.

"G. H. M." writes—"I have a cow which appears to be going blind. There is nothing very noticeable about the eyes, except that at times they appear to be a greenish color. Blindness is much more noticeable after sundown. When in the milking yard she runs over or into anything that may be in her way. No film can be noticed over the eyes." [F]

Answer—From the description the cow is evidently affected with palsy of the optic nerves (amaurosis). It may have been caused as the result of an injury in the region of the forehead, or may have been due to general weakness or debility. The cow should have tonics administered in the food twice daily. The following should be beneficial, viz:—Powdered nux vomica, 1½ozs.; powdered gentian, 3ozs.; powdered ginger, 3ozs.; powdered Epsom salts, 4ozs. Mix and make into 12 powders. Give one powder twice daily.

THE BREEDING OF FOALS.

"A. B.," Wilkawatt, asks—"1. In view of the number of unsatisfactory foals bred in this district this season, would the overfeeding of the sire for show purposes account for the unsoundness of the progeny? 2. *Re* cure for bots by administering sheep gall, (a) what would be a dose of sheep gall for horses so affected with bots? (b) where can sheep gall be obtained?"

Answer—1. This appears hardly probable. A full description should be forwarded, giving details of faulty conformation, &c., amongst the foals. 2. (a) The horse should be fasted for 24 hours; then give from 5ozs. to 10ozs. of ox or sheep bile mixed with an equal quantity of warm milk, and 2 drachms of thymol, or 30 drops of eucalyptus oil. An hour or so after allow the horse to drink copiously. Diet with bran mashes with salt in, then give a brisk purgative, preferably aloes or linseed oil with turpentine. (b) Ox or sheep bile can be procured from the nearest slaughtering establishment, and should be fresh.

ROSEWORTHY AGRICULTURAL COLLEGE.

Experiments Relating to the Depth of Sowing of Some Agricultural Seeds.

By ARTHUR J. PERKINS (Principal Roseworthy Agricultural College) and
W. J. SPAFFORD (Assistant Experimentalist).

(Continued from page 362.)

OATS.

Experiments relating to the depth of sowing for oats were carried out during two years, viz., 1908 and 1909, both in light sandy soil and in heavy clay loam.

OATS IN LIGHT SANDY SOIL IN 1908.

On June 13th, 50 grains of oats were sown at the various depths. Germination results are indicated below in Table XXII. :—

TABLE XXII.—*Showing Germination of Oats Sown in Light Sandy Soil in 1908.*

Depth of Sowing.	Germination Order and Numbers.											Total Nos. Germi- nated.										
	June.										July.											
	21	22	23	24	25	26	27	28	29	30	1		2	3	4	5	6	7	8	9	10	11
$\frac{1}{2}$ in.	1	3	21	18	—	1	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	46
1in.	—	3	19	13	9	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	45
1½in. ...	—	—	4	21	7	2	—	1	1	—	—	—	—	1	1	—	—	—	—	—	—	38
2in.	—	—	—	4	28	15	2	—	—	—	1	—	—	—	—	—	—	—	—	—	—	50
2½in. ...	—	—	—	—	—	3	11	21	3	2	1	1	1	—	—	—	1	—	—	—	—	44
3in.	—	—	—	—	—	1	4	9	4	13	9	1	—	3	1	—	—	1	—	—	—	46
3½in. ...	—	—	—	—	—	—	4	7	2	13	1	3	—	1	—	—	—	1	—	1	1	34
4in.	—	—	—	—	—	—	—	5	6	8	4	3	2	1	—	—	—	—	—	—	—	32
4½in. ...	—	—	—	—	—	—	—	—	—	—	5	14	8	2	1	1	1	—	1	—	1	34
5in.	—	—	—	—	—	—	—	—	—	8	8	11	2	2	—	—	—	1	—	1	—	33
5½in. ...	—	—	—	—	—	—	—	—	—	—	9	9	9	—	6	—	1	2	—	—	—	36
6in.	—	—	—	—	—	—	—	—	—	—	4	5	10	3	4	5	1	1	—	—	—	33

Plants sown between $\frac{1}{2}$ in. and 3in. deep came into bloom on November 2nd; those between 3½in. and 6in. deep on November 7th.

No harvest records of this series could be kept, as birds destroyed the bulk of the grain before maturity.

OATS IN LIGHT SANDY LAND IN 1909.

In 1909, 50 grains of oats were sown at the several depths on May 26th. Germination results are indicated in Table XXIII. :—

TABLE XXIII.—*Showing Germination of Oats Sown at Various Depths in Light, Sandy Land in 1909.*

Depth of Sowing.	Germination Order and Numbers.																		
	June.																		
½ in.	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21			
1 in.	1	—	—	—	1	5	7	1	9	5	—	1	11	3	—	1			
1½ in.	4	2	3	1	—	7	—	2	8	1	5	2	9	4	—	—			
2 in.	3	3	13	3	1	7	—	—	5	3	2	—	1	3	—	1			
2½ in.	—	4	7	3	—	4	3	—	4	3	4	2	9	3	—	1			
3 in.	—	—	4	7	—	8	3	1	2	2	2	3	6	2	—	—			
3½ in.	—	—	6	6	3	5	2	—	6	—	1	2	8	1	—	1			
4 in.	—	—	2	3	4	7	1	4	1	5	—	1	8	2	—	2			
4½ in.	—	—	1	3	5	5	2	6	2	1	2	3	9	1	2	1			
5 in.	—	—	—	2	—	3	3	4	4	4	1	1	11	2	1	3			
5½ in.	—	—	—	1	—	3	2	4	5	—	3	1	4	3	1	2			
6 in.	—	—	—	—	—	4	—	4	2	1	—	1	2	2	3	4			
6½ in.	—	—	—	—	—	1	2	5	2	3	—	2	2	—	2	2			

Depth of Sowing	Germination Order and Numbers.													Total Number Germinated.
	June.										July.			
	22	23	24	25	26	27	28	29	30	1	2	3	4	
½ in.	—	—	1	1	—	—	—	—	—	—	—	—	—	47
1 in.	—	1	—	—	—	—	—	—	—	—	—	—	—	49
1½ in.	—	—	1	—	—	1	—	—	—	—	—	—	—	47
2 in.	1	—	—	—	—	—	—	—	—	—	—	—	—	48
2½ in.	—	—	1	2	—	—	1	—	—	—	1	1	—	46
3 in.	1	—	1	—	—	1	—	—	—	—	—	—	—	44
3½ in.	2	—	1	1	2	—	—	—	—	—	—	—	—	46
4 in.	1	1	—	1	1	—	—	—	—	—	—	—	—	47
4½ in.	1	1	—	—	—	—	—	—	—	—	1	—	1	43
5 in.	1	1	3	1	—	2	—	—	—	—	—	—	—	37
5½ in.	2	2	1	3	3	2	—	—	—	—	—	1	—	37
6 in.	3	1	2	—	—	—	—	—	1	—	—	—	1	29

Plants of this series ripened off in safety, and we append below in Table XXIV. the harvest results recorded :—

TABLE XXIV.—*Showing Harvest Results of Oats Sown at Various Depths in 1909 (Light Sandy Land).*

Depth of Sowing.	Out of 50.		Grain.		Total Produce	
	Germinated.	Matured.	Total.	Per	Total.	Per
				Plant.		Plant.
			OZS.	OZS.	OZS.	OZS.
½ in.	47	42	16	0.38	72	1.71
1 in.	49	46	32	0.70	88	1.91
1½ in.	47	42	32	0.77	88	2.10
2 in.	48	47	32	0.68	80	1.70
2½ in.	46	44	24	0.55	64	1.45
3 in.	44	38	28	0.74	72	1.90
3½ in.	46	45	28	0.62	64	1.42
4 in.	47	42	28	0.67	64	1.52
4½ in.	43	41	16	0.39	52	1.27
5 in.	37	33	24	0.73	56	1.70
5½ in.	37	31	20	0.65	44	1.42
6 in.	29	27	16	0.59	48	1.80

It will be noticed that both total and individual yields, both of grain and total produce, are heaviest for plants from seed sown between $\frac{1}{2}$ in. and 3 in. in depth. The relatively low grain yields from plants sown only $\frac{1}{2}$ in. and 1 in. deep should, however, also be noticed.

SUMMARY OF THE GERMINATION OF OATS SOWN IN LIGHT SANDY LAND OVER TWO SEASONS.

The general germination results, together with the average germination percentages for the several depths of oats sown in light sandy land in 1908 and 1909, have been summarised below in Table XXV. :—

TABLE XXV.—*Showing Summary of Germination of Oats at Various Depths in Light Sandy Land in 1908 and 1909, together with Average Germination Percentages.*

Depth of Seeding.	Numbers Germinated. Out of 50.		Average Germination. Percentages.
	1908.	1909.	
$\frac{1}{2}$ in.	46	47	93
1 in.	45	49	94
$1\frac{1}{2}$ in.	38	47	85
2 in.	50	48	98
$2\frac{1}{2}$ in.	44	46	90
3 in.	46	44	90
$3\frac{1}{2}$ in.	34	46	80
4 in.	32	47	79
$4\frac{1}{2}$ in.	34	43	77
5 in.	33	37	70
$5\frac{1}{2}$ in.	36	37	73
6 in.	33	29	62

Although in 1908 birds left us no grain to harvest, an account was nevertheless kept of the number of plants that came to complete maturity. We are able, therefore, to show in Table XXVI. what was the average proportion of plants dying off after germination at the various depths in 1908 and 1909 :—

TABLE XXVI.—*Showing Percentage of Germinated Seeds of Oats Sown in Light Sandy Land reached Maturity in 1908 and 1909.*

Depth of Seeding.	1908.		1909.		Total Matured.	Percentage of Germinated Seed dying.
	Germinated.	Matured.	Germinated.	Matured.		
$\frac{1}{2}$ in.	46	46	47	42	88	5
1 in.	45	45	49	46	91	3
$1\frac{1}{2}$ in.	38	38	47	42	80	6
2 in.	50	49	48	47	96	2
$2\frac{1}{2}$ in.	44	44	46	44	88	2
3 in.	46	45	44	38	83	8
$3\frac{1}{2}$ in.	34	34	46	45	79	1
4 in.	32	31	47	42	73	7
$4\frac{1}{2}$ in.	34	34	43	41	75	3
5 in.	33	33	37	33	66	6
$5\frac{1}{2}$ in.	36	35	37	31	66	10
6 in.	33	33	29	27	60	3

Table XXV. shows that oat seed germinates very well when sown in light sandy land at depths of $\frac{1}{2}$ in. to 3 in. ; that germination continues good down to $5\frac{1}{2}$ in. ; and that it is even fair at 6 in. in depth, since about two-thirds of the seed sown at this depth in the two seasons germinated successfully. In this respect, therefore, the clothed grain of the oat resembles the similar grain of barley, and, unlike the naked grain of wheat, does not appear to resent comparatively deep seeding. Table XXVI. shows that on the whole the percentage of plants dying off after germination is perhaps greater where seed has been sown deeply than where it has been placed at relatively shallow depths.

An examination of the data available for 1908 and 1909 show that unpickled oat seed when sown in light sandy land will show above ground.

9 to 23 days after seeding if placed $\frac{1}{2}$ in. below the surface

10 to 22	"	"	1 in.	"	"
10 to 27	"	"	1 $\frac{1}{2}$ in.	"	"
11 to 23	"	"	2 in.	"	"
13 to 31	"	"	2 $\frac{1}{2}$ in.	"	"
13 to 28	"	"	3 in.	"	"
14 to 29	"	"	3 $\frac{1}{2}$ in.	"	"
14 to 26	"	"	4 in.	"	"
15 to 33	"	"	4 $\frac{1}{2}$ in.	"	"
15 to 30	"	"	5 in.	"	"
17 to 32	"	"	5 $\frac{1}{2}$ in.	"	"
17 to 33	"	"	6 in.	"	"

These data show the germination of oats to be on the whole somewhat slower than that of either wheat or barley in similar soil.

OATS IN HEAVY CLAY LOAM IN 1908.

Fifty grains of oats were sown in heavy clay loam at the several depths on June 10th. Germination results are shown below in Table XXVII. :—

TABLE XXVII.—*Showing the Germination of Oats in Heavy Clay Loam in 1908.*

Germination Order and Numbers.																						
Depth of Sowing.	June.											July.										Total Numbers Germinated.
	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	
$\frac{1}{2}$ in. ...	15	14	8	6	—	1	—	3	1	—	—	—	—	—	—	—	—	—	—	—	48	
1 in. ...	4	17	5	16	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	43	
1 $\frac{1}{2}$ in. ...	—	4	9	28	4	3	—	—	—	—	—	—	1	—	—	—	—	—	—	—	43	
2 in. ...	—	—	—	6	6	18	5	1	4	2	1	2	1	—	—	—	—	—	—	—	49	
2 $\frac{1}{2}$ in. ...	—	—	—	2	7	18	4	6	2	1	1	—	2	—	—	—	—	—	—	—	46	
3 in. ...	—	—	—	—	2	5	2	12	3	4	7	2	4	1	2	1	—	1	—	—	43	
3 $\frac{1}{2}$ in. ...	—	—	—	—	2	1	5	3	1	9	3	8	2	—	—	—	—	4	1	—	46	
4 in. ...	—	—	—	—	—	2	3	5	1	9	7	3	6	1	1	—	1	1	1	—	39	
4 $\frac{1}{2}$ in. ...	—	—	—	—	—	4	9	4	6	5	3	3	2	1	—	—	3	—	—	—	41	
5 in. ...	—	—	—	—	—	—	—	—	4	2	9	5	4	2	4	—	2	2	4	—	40	
5 $\frac{1}{2}$ in. ...	—	—	—	—	—	—	—	—	2	4	7	4	3	5	2	3	—	—	3	1	2	38
6 in. ...	—	—	—	—	—	—	—	—	—	2	4	2	7	4	3	3	1	3	1	—	37	
6 $\frac{1}{2}$ in. ...	—	—	—	—	—	—	—	—	—	—	2	4	2	7	4	3	3	1	3	1	—	31

Plants from seed sown $\frac{1}{2}$ in. to $1\frac{1}{2}$ in. deep came into bloom on November 12th; those from seed sown between 2 in. and 5 in. deep on November 14th; and those from seed sown $5\frac{1}{2}$ in. and 6 in. deep on November 16th.

We were able to save the grain of this series. Harvest results are summarised further on in conjunction with those recorded for 1909.

OATS IN HEAVY CLAY LOAM IN 1909.

Fifty grains of oats were sown in heavy clay loam at various depths on May 24th. Germination results are shown below in Table XXVIII. :—

TABLE XXVIII.—*Showing the Germination of Oats at Various Depths in Heavy Clay Loam in 1909.*

Depth of Sowing.	Germination Order and Numbers.																
	June.																
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
$\frac{1}{2}$ in.	16	5	16	7	1	1	1	—	1	—	—	—	1	—	—	—	
1 in.	6	16	11	4	3	3	—	—	—	—	1	1	—	—	—	—	
$1\frac{1}{2}$ in.	5	9	22	5	3	1	—	1	—	—	—	—	—	—	1	—	
2 in.	2	2	16	15	2	4	2	1	—	1	—	—	1	1	—	—	
$2\frac{1}{2}$ in.	—	7	8	9	6	4	3	1	2	2	—	—	1	—	1	—	
3 in.	—	—	6	20	2	8	1	2	—	—	—	—	1	1	3	1	
$3\frac{1}{2}$ in.	—	—	—	5	5	6	11	3	3	1	2	2	—	—	2	2	
4 in.	—	—	—	2	5	5	11	7	3	—	1	3	—	1	—	—	
$4\frac{1}{2}$ in.	—	—	—	—	1	—	1	3	8	3	2	2	2	1	—	—	
5 in.	—	—	—	—	—	4	5	11	1	2	—	2	—	—	2	2	
$5\frac{1}{2}$ in.	—	—	—	—	—	—	8	3	6	3	6	4	1	1	1	—	
6 in.	—	—	—	—	—	—	1	3	1	1	1	5	3	1	5	—	

Depth of Sowing.	Germination Order and Numbers.														Total Numbers Germinated.
	June.														
	18	19	20	21	22	23	24	25	26	27	28	29	30		
$\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	49	
1 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	45	
$1\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	47	
2 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	47	
$2\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	44	
3 in.	1	—	—	—	—	—	—	—	—	—	—	—	—	46	
$3\frac{1}{2}$ in.	2	—	1	—	—	—	—	1	—	—	—	—	1	47	
4 in.	2	1	—	1	—	—	—	1	—	—	—	—	—	43	
$4\frac{1}{2}$ in.	2	1	—	1	2	2	1	—	—	—	—	—	—	39	
5 in.	5	—	2	—	—	—	1	—	—	—	—	—	—	37	
$5\frac{1}{2}$ in.	4	1	—	1	—	—	—	—	—	—	—	—	—	39	
6 in.	1	1	1	1	—	—	—	—	1	—	—	—	—	26	

All the grain of this series was saved, and harvest results are summarised in conjunction with those of 1908 in Table XXIX. :—

TABLE XXIX.—*Showing Harvest Returns from Oats Sown at Various Depths in Heavy Clay Loam in 1908 and 1909.*

Depth of Sowing.	1908.		1909.		Total Matured.	Percentage of Germinated Plants Dying off. %	Grain.		Total Produce.	
	Germinated.	Matured.	Germinated.	Matured.			Total. ozs.	Per Plant. ozs.	Total. ozs.	Per Plant. ozs.
½ in. . .	48	48	49	49	97	0	54	0.56	200	2.06
1 in. . .	43	43	45	45	88	0	57	0.65	204	2.32
1½ in. . .	49	49	47	46	95	1	63	0.66	200	2.11
2 in. . .	46	45	47	47	92	1	63	0.68	200	2.17
2½ in. . .	43	40	44	44	84	3	66	0.79	196	2.33
3 in. . .	46	44	46	46	90	2	55	0.61	196	2.18
3½ in. . .	39	39	47	45	84	2	60	0.71	196	2.33
4 in. . .	41	39	43	42	81	4	58	0.72	200	2.47
4½ in. . .	40	36	39	37	73	8	51	0.70	192	2.63
5 in. . .	38	34	37	36	70	7	47	0.67	180	2.57
5½ in. . .	37	34	39	39	73	4	60	0.82	208	2.85
6 in. . .	32	30	26	24	54	7	29	0.52	120	2.22

Table XXIX. shows the yields of oats sown at various depths in heavy clay loam to have been substantially the same, even down to the 5½ in. limit. It would appear, therefore, that better than any other cereal oats admit of being sown fairly deeply; at all events at 3 in. and 4 in. depths no appreciable reduction in yields need be feared. The proportion of plants dying back after germination is somewhat heavier in deep sowing than in shallow sowing.

SUMMARY OF THE GERMINATION OF OATS SOWN AT VARIOUS DEPTHS IN HEAVY CLAY LOAM IN 1908 AND 1909.

We have summarised below in Table XXX. the germination results of the two seasons, and have at the same time indicated what appear to be the average germination percentages for the several depths.

TABLE XXX.—*Showing Summary of Germination of Oats at Various Depths in Heavy Clay Loam in 1908 and 1909, together with Average Germination Percentages.*

Depth of Seeding.	Numbers Germinated. Out of 50.		Average Germination. Percentages.
	1908.	1909.	
½ in.	48	49	97
1 in.	43	45	88
1½ in.	49	47	96
2 in.	46	47	93
2½ in.	43	44	87
3 in.	46	46	92
3½ in.	39	47	86
4 in.	41	43	84
4½ in.	40	39	79
5 in.	38	37	75
5½ in.	37	39	76
6 in.	32	26	58

We see, therefore, from the data of the above table that the most favorable germination of oats in heavy clay loam takes place when seed has been sown between $\frac{1}{2}$ in. and 3in. in depth; at greater depths germination continues satisfactory, as over three-quarters of the seed sown shows above ground after having been placed $5\frac{1}{2}$ in. below the surface.

Our 1908 and 1909 data show that unpickled oat seed when sown in heavy clay loam will show above ground.

10 to 20 days after seeding if placed $\frac{1}{2}$ in. below the surface

10 to 20	"	"	1in.	"	"
10 to 23	"	"	$1\frac{1}{2}$ in.	"	"
11 to 23	"	"	2in.	"	"
12 to 23	"	"	$2\frac{1}{2}$ in.	"	"
13 to 27	"	"	3in.	"	"
13 to 32	"	"	$3\frac{1}{2}$ in.	"	"
14 to 31	"	"	4in.	"	"
15 to 30	"	"	$4\frac{1}{2}$ in.	"	"
16 to 30	"	"	5in.	"	"
16 to 30	"	"	$5\frac{1}{2}$ in.	"	"
17 to 32	"	"	6in.	"	"

From the tables and data supplied we may derive the following conclusions bearing on the depth of sowing for oats—

1. Like barley, oats may be sown without danger at greater depths than wheat.

2. In light sandy land the most favorable depth for sowing oats would appear to lie between $1\frac{1}{2}$ in. and $2\frac{1}{2}$ in. For special purposes, however, depths of 3in., $3\frac{1}{2}$ in., and even 4in. may be resorted to in this type of soil without much danger of serious losses from faulty germination. Indeed, close on two-thirds of the seed sown will germinate successfully at depths of 6in.

3. In light sandy land the highest yields from oats would appear to be secured from plants sown 1in. to 2in. deep.

4. In light sandy land relatively shallow sowing would appear to result in greater losses after germination than is the case with depths of 2in. to $2\frac{1}{2}$ in.

5. In light sandy land the germination of oats would appear to be perceptibly slower than that of either barley or wheat. Germination of oats sown $1\frac{1}{2}$ in. to $2\frac{1}{2}$ in. deep extends over 10 to 30 days, whilst that of barley for similar depths extends over 9 to 18 days, and that of wheat over 10 to 21 days.

6. In heavy clay loam the most favorable depth for sowing oats would appear to be between $1\frac{1}{2}$ in. and 2in. In cases of necessity, however, greater depths may be resorted to, since at $5\frac{1}{2}$ in. fully three-quarters of the seed sown will germinate successfully.

7. In heavy clay loam the heaviest yields would appear to be secured from plants sown $1\frac{1}{2}$ in. to 2 in. deep. Very satisfactory yields are, however, obtainable from plants sown 3 in. to 4 in. deep.

8. In heavy clay loam the proportion of oat plants dying back after germination appears to be very small at shallow depths; from 4 in. downwards, however the proportions appear steadily to increase.

9. In heavy clay loam the germination period of oats sown $1\frac{1}{2}$ in. to 2 in. deep appears to extend from 10 to 23 days, and proportionately longer for greater depths.

FIELD BEANS AND PEASE.

Field beans and pease were tested only on one occasion, viz., in 1906, and then only in sandy soil. This single experiment tended to show that for both beans and pease 90 per cent. to 100 per cent. germination may be depended upon for all depths between $\frac{1}{2}$ in. and 6 in. It appears to us, however, that for both beans and pease depths of sowing of from 2 in. to 3 in. may generally be recommended in this type of soil.

MAIZE.

Maize was tested in both light sandy soil and heavy clay loam in 1908 and 1909. It should be stated here, by way of preface, that in a district in which maize is only occasionally grown without irrigation for green forage purposes, it is not always possible to sow this cereal in soil sufficiently moist to ensure immediate germination. In these circumstances maize is frequently sown at a time of the year when the surface layers of the soil have already come under the influence of early spring droughts, and germination must then depend very largely on the rain that falls subsequent to seeding operations. Similarly, the value and the growth of the maize crop is wholly dependent on the precarious supply of later spring and summer rains; hence any analysis of experimental data bearing on the depth of sowing maize must necessarily be preceded by a general statement of the weather conditions affecting both the period of germination and the period of growth of the plant. A statement having reference to these two periods is given below for both 1908 and 1909.

THE 1908 SEASON.

In 1908 the maize was sown on September 22nd in light sandy soil, and on September 24th in heavy clay loam. In the first place we indicate below the monthly rainfall from April 1st to September 22nd—April, 0.76 in.; May, 3.36 in.; June, 2.83 in.; July, 1.47 in.; August, 1.79 in.; September 1st to 22nd, 3.37 in.—total, 13.58 in.

In the first place, therefore, the ground may be taken to have received a thorough soaking in the winter months; and, secondly, the September fall, which was spread over 13 days, must have left the surface layers sufficiently

moist to have induced early germination. Rain falling towards the end of September and during the month of October may be said to have had a favorable influence both on germination and on the early growth of the young plants. We have, therefore, indicated it in detail below—September 23rd, 0.02in. ; September 25th, 0.03in. ; September 27th, 0.21in. ; September 28th, 0.06in.—total, 0.32in. October 7th, 0.10in. ; October 8th, 0.20in. ; October 15th, 0.55in. ; October 16th, 0.91in. ; October 17th, 0.20in. ; October 18th, 0.01in. ; October 19th, 0.16in. ; October 20th, 0.02in.—total, 2.15in. ; grand total, 2.47in.

Hence, not only was the maize seed sown originally in land sufficiently moist to induce early germination in 1908, but, in addition, subsequently to seeding operations, there fell an abundance of rain to promote healthy development in the young germinated plants.

The maize plants were harvested in January, and we indicate, therefore, below, in summary, what rain fell in the intervening months—November, 0.07in. ; December, 0.21in. ; January, 1909, 0.75in.—total, 1.03in.

It will be noted that summer rains were, on the whole, fairly scanty, and, in consequence, good growth in the maize plants could not be anticipated.

THE 1909 SEASON.

In 1909 the maize was sown in light sandy soil on October 18th, and on the same date in heavy clay loam. Rain preceding the seeding period is indicated below—April, 1.91in. ; May, 2.89in. ; June, 1.84in. ; July, 3.80in. ; August, 4.56in. ; September, 1.52in. ; October 1st to 18th, 2.00in.—total, 18.52in.

Hence, as had previously proved to be the case in 1908, both the winter and the early spring rains of 1909 were such as to offer quite adequate preparation for the maize crop. We now proceed to show, in detail, what rain fell during the actual germination period in 1909—October 24th, 0.16in. ; October 28th, 0.06in. ; October 29th, 0.33in.—total, 0.55in. November 9th, 0.52in. ; November 10th, 0.15in. ; November 13th, 0.56in. ; November 14th, 0.10in. ; November 15th, 0.04in. ; November 18th, 0.32in. ; November 19th, 0.08in. ; November 22nd, 0.26in. ; November 23rd, 0.05in.—total, 2.08in. ; grand total, 2.63in.

Again, in 1909 during the actual germination period rains were amply sufficient to bring about rapid germination and healthy growth in the young plants. Finally, later rains, which may be taken to have determined the final value of the crop, were distributed as follows :—December, 1909, 0.70in. ; January, 1910, 1.72in.—total, 2.42in.

It will be seen, therefore, that the summer fall, on which the growth of the maize crop mainly depends, although not heavy in 1909, was, nevertheless, much superior to that of 1908. In our general farm summer crops we had ample evidence of the favorable character of this season.

MAIZE IN LIGHT SANDY LAND IN 1908.

In 1908 fifty grains of maize corn were sown in light sandy land at depths between $\frac{1}{2}$ in. and 6 in. on September 22nd. Germination results are shown below in Table XXXI.

TABLE XXXI.—*Showing Germination of Maize at Various Depths in Light Sandy Land.*

Depth of Sowing.	Germination Order and Numbers.														
	October.														
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
$\frac{1}{2}$ in.	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
1 in.	3	5	18	7	1	—	—	—	—	—	—	—	—	—	—
1½ in.	7	11	21	4	2	—	—	—	—	—	—	—	—	—	—
2 in.	—	—	24	17	2	—	—	—	—	—	—	—	—	—	—
2½ in.	—	—	8	29	9	1	—	—	—	—	—	—	—	—	—
3 in.	—	—	2	19	15	—	—	—	1	—	—	—	—	—	—
3½ in.	—	—	—	18	22	2	2	—	—	—	—	—	—	—	—
4 in.	—	—	—	3	28	6	1	1	—	—	—	—	—	—	—
4½ in.	—	—	—	2	23	8	1	2	—	—	—	—	—	—	—
5 in.	—	—	—	—	20	12	1	—	—	1	—	—	—	—	—
5½ in.	—	—	—	—	11	17	4	1	—	1	—	—	—	—	1
6 in.	—	—	—	—	10	17	5	2	—	2	—	1	—	—	—

Depth of Sowing.	Germination Order and Numbers.													Total Number Germinated.
	October.													
	16	17	18	19	20	21	22	23	24	25	26	27		
$\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	8	9	
1 in.	—	—	—	—	1	—	—	—	—	—	—	5	40	
$1\frac{1}{2}$ in.	—	—	—	—	1	—	—	—	—	—	—	—	46	
2 in.	—	—	—	—	—	—	—	—	—	—	—	—	43	
$2\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	47	
3 in.	—	1	—	—	—	—	—	—	—	—	—	—	38	
$3\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	44	
4 in.	—	—	—	—	—	—	—	—	—	—	—	—	39	
$4\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	36	
5 in.	—	2	—	—	—	—	—	—	—	—	—	—	36	
$5\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	35	
6 in.	—	—	—	—	—	—	—	—	—	—	—	—	37	

Young maize plants appear to experience greater difficulty in breaking through a surface soil crust than is the case with most other cereals; hence it is more or less customary to deprecate the deep sowing of maize. Nevertheless, a casual glance at Table XXXI. will serve to show how unwise it would be to sow maize at very shallow depths in light sandy soil, unless one be in a position to maintain the surface layers adequately moist by artificial irrigation. It has already been stated that the winter rains had been fairly heavy, and that as much as 3.37 in. had fallen between the 1st and the 22nd of September; hence the soil must be taken to have been in good seeding condition for maize sown on September 22nd; indeed, we have clear evidence

of this in the rapid germination of the grain placed at the greater depths. The surface layers of light sandy land, however, show a tendency to dry off very rapidly under the influence of rising spring temperatures; hence we find that maize placed $\frac{1}{2}$ in. below the surface of the soil showing only an 18 per cent. germination, and of this 16 per cent. did not show above ground until 34 days after seeding operations, evidently under the influence of rather heavy rains falling between the 15th and the 16th of October. When placed at a depth of 1 in. the germination of maize was more satisfactory, being finally represented by 80 per cent.; but even at this depth 10 per cent. of the seed showed up very late under the same influence that affected the bulk of the seed placed $\frac{1}{2}$ in. deep. Depths of sowing of 1 $\frac{1}{2}$ in. to 4 in. appear to have given the best results; although, on the whole, depths of 5 in. and 6 in., with germination percentages of 70 per cent. to 74 per cent. are almost equally good.

The maize plants of this series were duly harvested on January 7th after a rather dry spell of weather. Full details concerning harvest results are shown below in Table XXXII.

TABLE XXXII.—*Showing Harvest Results of Maize Sown at Various Depths in Light Sandy Land in 1908.*

Depth of Sowing.	Plants		Percentage of Germinated Plants Dying	Weight of Plants.	
	Germinated.	Matured.		Total.	Individual.
			Off. %	Ozs.	Ozs.
$\frac{1}{2}$ in.	9	0	100	0	0
1 in.	40	18	45	84	4.7
1 $\frac{1}{2}$ in.	46	34	26	136	4.0
2 in.	43	32	21	136	4.3
2 $\frac{1}{2}$ in.	47	43	9	140	3.3
3 in.	38	35	8	120	3.4
3 $\frac{1}{2}$ in.	44	40	9	132	3.3
4 in.	39	33	15	104	3.2
4 $\frac{1}{2}$ in.	36	32	11	120	3.8
5 in.	36	31	14	120	3.9
5 $\frac{1}{2}$ in.	35	28	20	128	4.6
6 in.	37	27	27	224	8.3

The fourth column in Table XXXII. shows that the percentage of plants germinating and subsequently dying off is very high for the shallower depths at which the maize was sown. Thus, all maize plants germinating from $\frac{1}{2}$ in. depth died back shortly afterwards; nearly half of those germinating from 1 in. depth experienced a similar fate; and one-quarter and a fifth respectively of those germinating from 1 $\frac{1}{2}$ in. and 2 in. depth disappeared in a similar way. The proportion of plants failing to reach maturity after germination was lowest for depths of 2 $\frac{1}{2}$ in. to 3 $\frac{1}{2}$ in. Similarly, if we except the, perhaps, anomalous case of the 6 in. depth, the best returns in green forage appear to have been secured from depths of 1 $\frac{1}{2}$ in. to 3 $\frac{1}{2}$ in.

MAIZE IN LIGHT SANDY LAND IN 1909.

In 1909 fifty grains of maize were sown in light sandy land at distances of $\frac{1}{2}$ in. to 6 in. on October 18th. Germination results are shown below in Table XXXIII.

TABLE XXXIII.—*Showing Germination of Maize at Various Depths in Light Sandy Land in 1909.*

Depth of Sowing.	Germination Order and Numbers.																		
	October.							November.											
	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12
$\frac{1}{2}$ in.	—	—	—	—	—	3	1	2	—	8	9	14	3	—	—	—	—	—	—
1 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1½ in.	4	12	7	1	4	6	—	5	1	1	1	2	—	—	—	—	—	—	—
2 in.	10	20	7	—	3	—	—	—	—	—	—	1	—	—	—	—	—	—	—
2½ in.	5	30	6	1	1	—	—	1	—	1	—	—	—	—	—	—	—	—	—
3 in.	7	21	14	3	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—
3½ in.	2	28	9	4	2	—	—	—	—	1	—	—	—	—	—	—	—	—	—
4 in.	1	21	14	3	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
4½ in.	—	12	24	1	1	2	1	—	—	—	—	—	—	—	—	—	—	—	—
5 in.	—	11	26	4	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5½ in.	—	3	18	11	1	1	—	—	1	—	—	—	—	1	—	—	—	—	—
6 in.	—	—	16	15	4	2	—	—	1	—	—	—	—	—	—	—	—	—	—

Depth of Sowing.	Germination Order and Numbers.																		Total Number Germinated.
	November.																		
	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27				
$\frac{1}{2}$ in.	1	—	—	—	—	—	—	32	—	—	—	—	—	—	1		41		
1 in.	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—		42		
1½ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		44		
2 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		41		
2½ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		45		
3 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		47		
3½ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		46		
4 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		40		
4½ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		41		
5 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		42		
5½ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		36		
6 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		38		

Here again, as in 1908, shallow sowing in 1909 gave rise in light sandy land to very irregular germination. It is true that in this year $\frac{1}{2}$ in. sowing gave rise ultimately to an 82 per cent. germination. Nevertheless, at this depth, 32 days after seeding operations, only 16 per cent. of the seed sown had germinated; whilst the balance that eventually showed above ground, viz., 66 per cent. of the seed sown, evidently germinated under the influence of rather heavy rains falling between the 13th and 18th of November; and this, notwithstanding the fact that winter rains had been exceptionally heavy, and 2 in. of rain had fallen in the first 17 days of October preceding seeding operations. Seed placed 1 in. below the surface germinated more regularly, but was fully five to 10 days later than seed placed at greater depths, where moisture may be taken to have been greater. On the whole, the most satisfactory germination appears to have taken place at depths of 2 in. to 4 in.; results at depths of 5 in. to 6 in. were, however, also very good.

The plants of this series were duly harvested on February 9th. Harvest results are shown below in Table XXXIV.

TABLE XXXIV.—*Showing Harvest Results of Maize Sown at Various Depths in Light Sandy Land in 1909.*

Depth of Sowing.	Plants		Percentage of Germinated Plants Dying	Weight of Plants.	
	Germinated.	Matured.		Total.	Individual.
			Off. %	Ozs.	Ozs.
$\frac{1}{2}$ in.	41	30	27	96	3.2
1in.	42	33	21	176	5.3
$1\frac{1}{2}$ in.	44	40	9	240	6.0
2in.	41	38	7	224	5.9
$2\frac{1}{2}$ in.	45	43	4	256	5.9
3in.	47	45	4	208	4.6
$3\frac{1}{2}$ in.	46	43	7	182	4.2
4in.	40	37	8	224	6.1
$4\frac{1}{2}$ in.	41	38	7	182	4.8
5in.	42	42	0	224	5.3
$5\frac{1}{2}$ in.	36	36	0	128	3.6
6in.	38	37	3	160	4.3

Here again we see that the percentage of plants dying off after germination was fairly considerable at the shallower depths tested, viz., 27 per cent. and 21 per cent. for $\frac{1}{2}$ in. and 1in. respectively. So far as actual yields are concerned, these proved most satisfactory where the plants had sprung from a $2\frac{1}{2}$ in. depth. Relatively to the latter, however, yields must be taken to have been good for all depths between $1\frac{1}{2}$ in. and 5in.

SUMMARY OF THE GERMINATION OF MAIZE SOWN IN LIGHT SANDY LAND OVER TWO SEASONS.

General germination results for the seasons 1908 and 1909 of maize sown in light sandy land have been summarised below in Table XXXV.

TABLE XXXV.—*Showing Summary of General Germination Results, together with Average Germination Percentages, of Maize Sown at Various Depths in Light Sandy Land in 1908 and 1909.*

Depth of Sowing.	Numbers Germinated.		Average Germination Percentage.	Average Percentage of Germinated Plants Dying Back.
	Out of 50. 1908.	Out of 50. 1909.		
			%	%
$\frac{1}{2}$ in.	9	41	50	40
1in.	40	42	82	38
$1\frac{1}{2}$ in.	46	44	90	18
2in.	43	41	84	17
$2\frac{1}{2}$ in.	47	45	92	7
3in.	38	47	85	6
$3\frac{1}{2}$ in.	44	46	90	8
4in.	39	40	79	11
$4\frac{1}{2}$ in.	36	41	77	9
5in.	36	42	78	6
$5\frac{1}{2}$ in.	35	36	71	10
6in.	37	38	75	17

Hence the average figures for two seasons show the germination of maize in light sandy land to have been best at depths of from $1\frac{1}{2}$ in. to $3\frac{1}{2}$ in. The relatively high percentage of plants dying off after germination at depths of $\frac{1}{2}$ in. to 2 in. would appear, however, to indicate a depth of sowing between $2\frac{1}{2}$ in. and $3\frac{1}{2}$ in. as being most suitable for maize in light sandy land.

When the requisite degrees of warmth and moisture are present in the soil, the germination of maize seed in light sandy land is fairly rapid, even when sown at considerable depths. Shallow sowing, on the other hand, has the effect of postponing germination until such time as heavy rains shall have fallen. The mean germination periods for the two seasons and for the several depths are shown below.

Maize seed showed above ground in light sandy land—

15 to 38 days after seeding if placed $\frac{1}{2}$ in. below surface				
11 to 34	"	"	1 in.	"
8 to 19	"	"	$1\frac{1}{2}$ in.	"
9 to 16	"	"	2 in.	"
9 to 16	"	"	$2\frac{1}{2}$ in.	"
9 to 20	"	"	3 in.	"
10 to 16	"	"	$3\frac{1}{2}$ in.	"
10 to 15	"	"	4 in.	"
10 to 15	"	"	$4\frac{1}{2}$ in.	"
11 to 17	"	"	5 in.	"
11 to 22	"	"	$5\frac{1}{2}$ in.	"
11 to 18	"	"	6 in.	"

MAIZE IN HEAVY CLAY LOAM IN 1908.

In 1908 fifty grains of maize corn were sown in heavy clay loam at depths between $\frac{1}{2}$ in. and 6 in. on September 24th. Germination results are shown below in Table XXXVI.

TABLE XXXVI.—*Showing the Germination of Maize at Various Depths in Heavy Clay Loam in 1908.*

Depth of Sowing.	Germination Order and Numbers.															
	October.															
	4	5	6	7	8	9	10	11	12	13	14	15	16			
$\frac{1}{2}$ in.	—	4	—	—	—	—	—	—	—	—	—	—	—			
1 in.	2	26	9	2	—	—	—	—	—	—	—	—	—			
$1\frac{1}{2}$ in.	—	20	14	3	—	2	—	—	—	—	—	—	—			
2 in.	—	14	22	2	1	1	1	—	—	1	—	—	—			
$2\frac{1}{2}$ in.	—	2	18	6	—	3	—	1	2	—	—	—	—			
3 in.	—	—	20	15	1	—	1	2	1	—	—	—	—			
$3\frac{1}{2}$ in.	—	—	16	13	—	5	2	—	—	—	—	—	1			
4 in.	—	—	1	12	12	6	4	1	—	1	—	—	2			
$4\frac{1}{2}$ in.	—	—	—	7	8	9	4	2	3	—	—	—	—			
5 in.	—	—	—	—	4	12	9	5	2	—	1	—	—			
$5\frac{1}{2}$ in.	—	—	—	—	5	9	7	2	7	2	2	—	1			
6 in.	—	—	—	—	—	1	4	6	10	—	—	2	1			

TABLE XXXVI.—(Continued.)

Depth of Sowing.	Germination Order and Numbers.											Total Number Germi- nated.
	October.											
	17	18	19	20	21	22	23	24	25	26	27	
$\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	33	37
1 in.	—	—	—	—	—	—	—	—	—	—	1	40
$1\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	1	40
2 in.	—	—	—	—	—	—	—	—	—	—	—	42
$2\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	32
3 in.	—	—	—	—	—	—	—	—	—	—	—	40
$3\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	37
4 in.	—	—	—	—	—	—	—	—	—	—	—	39
$4\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	33
5 in.	—	—	—	—	—	—	—	—	—	—	—	33
$5\frac{1}{2}$ in.	—	—	1	—	—	—	—	—	—	—	—	36
6 in.	—	—	2	—	—	—	—	—	—	—	—	26

Here again the irregularity of the germination of shallowly sown maize will be noted. At the $\frac{1}{2}$ in. depth no more than 8 per cent. of the seed sown germinated immediately, whilst 66 per cent. of it did not show above ground until 33 days after seeding operations, evidently under the influence of heavy rains falling on the 15th and 16th of October. Contrary, however, to what we have shown to be the case in light sandy land, in heavy clay loam the germination of maize in 1908 was practically normal for all depths from 1 in. and downwards. We may account for this by the fact that the heavier soil is naturally more retentive of moisture; and that in consequence the drying influence of early spring warmth will penetrate less deeply than would be the case in a light sandy soil.

The plants of this series were duly harvested on January 7th. Full results concerning them are shown below in Table XXXVII.

TABLE XXXVII.—Showing Harvest Results of Maize Sown at Various Depths in Heavy Clay Loam in 1908.

Depth of Sowing.	Plants.		Percentage of Germinated Plants Dying	Weight of Plants.		
	Germinated.	Matured.		Off. %	Total.	Individual.
					Ozs.	Ozs.
$\frac{1}{2}$ in.	37	1	97	12	12.0	
1 in.	40	21	48	72	3.4	
$1\frac{1}{2}$ in.	40	24	40	112	4.7	
2 in.	42	28	33	148	5.3	
$2\frac{1}{2}$ in.	32	21	34	148	7.0	
3 in.	40	24	40	164	6.8	
$3\frac{1}{2}$ in.	37	29	22	184	6.3	
4 in.	39	25	36	172	6.9	
$4\frac{1}{2}$ in.	33	25	24	164	6.6	
5 in.	33	29	12	156	5.4	
$5\frac{1}{2}$ in.	36	30	17	192	6.4	
6 in.	26	23	12	200	8.7	

A glance at Table XXXVII. will show, in the first place, that at all depths the percentage of plants dying back after germination was fairly heavy in

Maize sown in heavy clay loam in 1909 again illustrates the irregularity of germination of seed sown at very shallow depths; twenty days after seeding only 14 per cent. of seed sown $\frac{1}{2}$ in. deep had shown above ground; whilst 12 days later, i.e., 32 days after seeding, another 58 per cent. of the seed sown germinated under the influence of heavy rain falling between the 13th and 18th of November. In this instance seed sown 1 in. deep germinated fairly satisfactorily. The best and most regular results, however, appear to have been secured for depths varying between 2 in. and 4 in.

Plants of this series were duly harvested on February the 9th. Full results concerning them are summarised below in Table XXXIX.

TABLE XXXIX.—*Showing Harvest Results of Maize Sown at Various Depths in Heavy Clay Loam in 1909.*

Depth of Sowing.	Plants		Percentage of Germinated Plants Dying Off.	Weight of Plants.	
	Germinated.	Matured.		Total.	Individual.
			%	Ozs.	Ozs.
$\frac{1}{2}$ in.	36	28	22	256	9.1
1 in.	44	39	11	512	13.1
$1\frac{1}{2}$ in.	44	43	2	320	7.4
2 in.	41	39	5	416	10.7
$2\frac{1}{2}$ in.	44	42	5	528	12.6
3 in.	36	35	3	416	11.9
$3\frac{1}{2}$ in.	42	39	7	512	13.1
4 in.	43	42	2	720	17.1
$4\frac{1}{2}$ in.	44	43	2	848	19.7
5 in.	43	40	7	816	20.4
$5\frac{1}{2}$ in.	38	38	0	768	20.2
6 in.	38	38	0	896	23.6

In 1909, a year with an unusually favorable summer rainfall, the percentage of plants failing to reach maturity was considerably lower than was the case in 1908, in which summer months were, perhaps, unusually dry. The percentage, nevertheless, was still heavy for plants sown at the shallow depths of $\frac{1}{2}$ in. and 1 in. It should be noted, too, that the heaviest yields, both individual and total, were secured from plants sown between 4 in. and 6 in. deep.

SUMMARY OF THE GERMINATION OF MAIZE SOWN IN HEAVY CLAY LOAM OVER TWO SEASONS.

The general germination results for the two seasons—1908 and 1909—have been summarised in Table XL.

TABLE XL.—*Showing Summary of Germination Results, together with Average Germination Percentages, of Maize Sown at Various Depths in Heavy Clay Loam in 1908 and 1909.*

Depth of Sowing.	Numbers Germinated.		Average Germination Percentage.	Average Percentage Matured.	Average Percentage of Plants Dying Off After Germination.
	Out of 50. 1908.	Out of 50. 1909.			
			%	%	%
$\frac{1}{2}$ in.	37	36	73	29	60
1in.	40	44	84	60	29
$1\frac{1}{2}$ in.	40	44	84	67	20
2in.	42	41	83	67	19
$2\frac{1}{2}$ in.	32	44	76	63	17
3in.	40	36	76	59	22
$3\frac{1}{2}$ in.	37	42	79	68	14
4in.	39	43	82	67	20
$4\frac{1}{2}$ in.	33	44	77	68	12
5in.	33	43	76	69	9
$5\frac{1}{2}$ in.	36	38	74	68	8
6in.	26	38	64	61	5

The summary of the results of two seasons would appear, therefore, to indicate that in heavy clay loam a depth of seeding below $1\frac{1}{2}$ in. is not safe for maize. At the same time the higher yields secured at greater depths of seeding, together with the evident protection against drought which the young seedlings find at these greater depths, induce us to believe that a depth of seeding between 2in. and 4in. will prove most suitable for maize under conditions obtaining in this district.

For the two seasons—1908 and 1909—the average rate of germination of maize at the various depths in heavy clay loam corresponded to the figures below.

The germination process extended from—

12 to 33 days when the seed was sown	$\frac{1}{2}$ in. deep
8 to 25	1in. "
8 to 27	$1\frac{1}{2}$ in. "
9 to 16	2in. "
9 to 14	$2\frac{1}{2}$ in. "
9 to 15	3in. "
10 to 17	$3\frac{1}{2}$ in. "
10 to 16	4in. "
10 to 15	$4\frac{1}{2}$ in. "
11 to 19	5in. "
11 to 20	$5\frac{1}{2}$ in. "
12 to 21	6in. "

GENERAL CONCLUSIONS.

We think that the following general conclusions, having reference to the sowing of maize in the conditions in which we are situated, may legitimately be derived from these two years' experiments :—

1. Whether the soil be light or heavy in nature, shallow seeding is to be avoided for maize, unless, indeed, the superficial soil layers can be maintained to the requisite degree of moisture by means of artificial irrigation.

2. The following disadvantages appear to be the natural consequences of shallow seeding :—

(a) Late and irregular germination almost wholly dependent on the character and abundance of rains falling subsequently to seeding operations.

(b) Whilst the rains that follow seeding operations may often suffice to bring about a fairly high germination percentage, the character of the weather at this time of the year is usually such as to bring about the speedy drying up of the surface layers of the soil in which would be placed the germinating plants. The usual consequence, in such circumstances, is that the great bulk, if not the whole, of the germinated plants die off without attaining to any size.

(c) The development of those rare plants that are able to struggle on in spite of shallow seeding is rarely equal to that of plants springing from greater depths.

3. The actual depth to be adopted for the sowing of maize will vary with circumstances, and not necessarily with the texture of the soil; it should be regulated mainly by the general moisture conditions of the soil at the time of seeding. It appears essential that maize seed should be placed in a layer of soil not only sufficiently moist to bring about immediate germination, but also with moisture sufficient to tide over the early stages of development of the young plants; hence, although it may be admitted that the surface layers of light sandy soil tend to dry off more rapidly in the spring months of the year than is the case with those of soils of heavier texture, nevertheless relatively deep sowing appears to be quite as essential in the latter as in the former case.

4. It is not possible, sharply, to define in figures a depth of sowing likely to prove applicable to all cases. It may be pointed out, however, that with us, in so far as the germination percentage was concerned, the extreme depth of 6in. did not prove excessive; and that in some instances it yielded the most satisfactory growth of all. It appears to us, however, that for ordinary purposes a depth of 3in. to 4in. might safely be recommended, with the proviso that the later in the year seeding operations take place the deeper should the seed be sown.

5. Given the presence of favorable moisture conditions in the layer of soil in which the seed is placed, the rapidity of germination is dependent wholly on the actual temperature of the latter; hence germination is more rapid towards the end of spring than at the beginning. It is thus that we found that maize sown late in September at a depth of 3in. took 12 to 15 days to show above ground; whilst maize sown at the same depth in October reached the same stage in seven to 10 days.

(To be continued.)

THE BROKEN HILL FRUIT TRADE.

USE OF KEROSENE AND BENZINE CASES.

For several months past fruits, plants, and vegetables put up in new packages have been dispatched from South Australia to Broken Hill without having undergone the inspection prior to export which had been insisted upon by the New South Wales Government for a good many years past. This, however, is the only inter-State trade in which the use of secondhand fruit cases is yet permitted; but they must be dipped in boiling water or steamed, and be certified to that effect by an inspector to be accepted. Recently the question was raised whether a case from which kerosine or benzine tins had just been removed was a secondhand case, and the inspectors at Broken Hill ruled these must be dipped and certified in the usual way before being filled with fruit for that town. This ruling caused considerable trouble in outlying country districts where an inspector was not available at all times to see the cases dipped or steamed. With a view to ameliorating this condition the New South Wales department was appealed to in reference to permitting the use of kerosine and benzine cases which had never contained fruit. On Thursday, November 29th, the Under Secretary for Agriculture in Sydney replied as follows:—

“Relating to the question of permitting the use of kerosine and benzine cases for packing fruit sent from South Australia to Broken Hill, I have to inform you this department has no objection to such cases being used provided they do not impart any foreign flavor to the fruit; but if complaints are received from importers at Broken Hill that such is the case the practice will have to be discontinued.” This concession is made in the interests of those growers who, it is contended, cannot obtain the services of an inspector to supervise the dipping or obtain other cases. The cases should be dipped in boiling water or steamed, and the sender is to certify that this treatment has been effected, the certificate referred to being forwarded to the fruit inspector at Broken Hill.

BEE-KEEPING NOTES.

THE METAMORPHOSIS OF THE BEE.

By T. E. WHITELOW, Inspector of Apiaries.

Among the numerous inhabitants of the insect world one of the most interesting, from a scientific and practical view point, is the insect associated with the production of honey—the common hive bee. An examination of its life history reveals to the entomologist and the public generally how wonderfully it is constructed to perform the task to which it is ordained by Nature—the fertilisation of flowers.

The classification of the bee is as follows:—

Kingdom—Animal.

Sub-kingdom—*Annulosa* (having their bodies in rings).

Division—*Arthropoda* (with jointed feet).

Class—*Insecta* (having their bodies in three parts. Passing through four stages of existence—egg, larva, pupa, and imago).

Order—*Hymenoptera* (possessing four membraneous wings).

Family—*Apidae* (long-tongued bees feeding on honey and pollen).

Genus—*Apis* (the hive bee).

Species—*Mellifica*.

Varieties—Teyton, Italian, Cyprian, Carniolan, Caucasian, &c.

Another family consists of the short-tongued bees, the *Andrenidae* which, together with the *Apidae*, consist of nearly 2,000 distinct species. So far as my knowledge extends I believe that very few of these are found in the Commonwealth. The *Andrenidae* are of no utility to the beekeeper for honey-gathering purposes, and only a few of the *Apidae* are useful in this respect.

Undoubtedly the main object in the creation of this multitude of insects, devoted to the gathering of nectar and pollen, is to ensure the more certain conveyance from flower to flower of the pollen dust, by which fertile seed is produced. Fruitgrowers especially should consider this matter, for the bees perform useful work in setting the fruit blossom, and undoubtedly assist in rendering the crops more certain.

At the commencement of summer, under normal circumstances, three kinds of bees will be found in a hive of bees—one queen, who is a fully-developed female, laying all the eggs from which the other bees are produced; a few hundred drones or males who, beyond the duty of copulation, lead an idle existence; and the remaining population will comprise from 30,000 to 80,000 workers, which are partially developed females, who, as their name denotes, perform the arduous work of the hive. The number of the latter varies with the vitality of the colony and to conditions which have either aided or retarded the increase of population.

The queen, although subject to the will of her offspring, is essentially the spirit of the hive, for upon her devolves the maternal task of reproduction.

On her to a very large extent depends the future prosperity of the hive, for she is the mother of the working element. During the height of the season under favorable conditions she is able to lay from 2,000 to 3,000 eggs per day. Her span of existence may extend to several years, but usually after the second or third year her egg-bearing proclivities begin to wane.

The workers perform the toil of the hive, and their tasks are varied and numerous. They manufacture the wax with which to build the combs in which they rear and feed their young. Foragers for nectar, pollen, and propolis are they, and the examination of a hive at night will reveal an army of diligent insects within the entrance busily fanning their wings to create the circulation of air necessary to remove the surplus moisture in the honey, which has been converted from nectar. Their life is a brief one, for during the exacting labors of a busy summer they only live from six to eight weeks. In the dormant period of the year the wear and tear on their tissues and muscular strength is not so great, and they live longer.

The drones are proverbial idlers, and their sole claim for existence is the fertilisation of the young queens when born; and once their object is accomplished and the honey flow commences to decrease they are driven from the hive to die.

The wax combs are composed of hexagonal cells, which are the receptacles for the honey and pollen, and are also used for rearing the larvæ; in other words, they are the cradles for the young. The worker cells are one-fifth of an inch in width, and about one-half of an inch deep, measuring 27 to 29 cells to one square inch. The drone cells are larger, being one-quarter of an inch in diameter and five-eighths of an inch in depth, and about 16 to 18 are contained in one square inch.

Queens are reared in specially built cells, which project from the combs, and are shaped very much like a thimble with its point downwards. They are only constructed when the condition of the hive necessitates the presence of young queens. The work of nursing and feeding the brood is a great strain on the resources of a hive, and necessitates a large consumption of food.

TABLE OF METAMORPHOSIS.

	Number of Days.		
	Queen.	Worker.	Drone.
Egg stage	3	3	3
Feeding period as larva	5	5	6
(The cells are capped on the ninth day.)			
Spinning cocoon	1	2	3
Period of rest	2	3	3
Transition from larva to nymph	1	1	1
Transition from nymph to perfect adult	3	7	9
The full-grown insect emerges	15	21	25

The above periods vary slightly in accordance with varying conditions that may exist, such as temperature, the strength and circumstances of the hive of bees. The egg is ovoid in shape, being slightly thicker at one end, and is covered with a delicate membranous network. When first laid in the cell it is in an upright position, gradually sinking down, so that on the third day it is in a horizontal position; it then hatches into a small apodal larva.

The worker larva is fed for five days, but on the third day it is weaned by having a mixture of honey and digested pollen added to the chyle food. The same egg, if especially reared in a queen cell, would produce a queen if fed continuously throughout the feeding period on chyle food. Beekeepers when rearing queens have to exercise the greatest care to see that the bees do not select larvæ for the future queens which have already entered the weaning stage. Should this happen, very inferior queens would be bred, and it is probable that in some instances they would be drone breeders or fertile workers.

The white larva which hatches from the egg is footless, and is made up of 13 segments. During the feeding period it lies curled up in the bottom of the cell and grows rapidly, and as its size increases a vertical position is assumed. Several moults are undergone, and eventually the grub is sealed over in the cell with a porous capping of wax and pollen. It then spins a silken cocoon with the aid of a silken fluid derived from the silk glands, which eventually become the salivary glands of the mature insect.

After the period of rest which follows many changes ensue, the larva changing to a nymph or chrysalis. The segments of its body form into the head, thorax, and abdomen. The legs, antennæ, mandibular, and wings come prominently into view, and the organs gradually commence to color, and eventually, in the case of a worker, the perfect insect emerges, about 21 days after the egg was first laid.

The walls of the cells in an old piece of brood comb will be largely composed of the cocoons and cast-off skins of the countless insects which have hatched from them. When rendering old combs into wax, advantage is taken of this knowledge. The skins will absorb a quantity of the molten wax, which is then very difficult to completely remove. If, however, the combs are well soaked previous to the rendering process, the cocoons become saturated with water, and will not absorb the wax so readily.

After hatching from the cell the young worker is for a few hours in a somewhat feeble condition, having a silvery-grey appearance. Strength is soon gained, and she takes her place in the army of insects attending to the requirements of the young brood. Later she will join the foragers in search of nectar and pollen, and eventually a useful existence will be terminated by death, which usually takes place away from the hive.

THE WHEAT CROP.

Official Forecast: Probable Average, 9'54 Bushels.

The work of compiling the official estimate of the wheat and hay harvest for the season 1911-12 was completed by the Government Statist (Mr. L. H. Sholl) and the officials of the department on Wednesday, November 29th. The actual figures for the past season and the estimated ones for the present season are given in detail in the following pages. In the table below the official totals for the State are shown, together with the estimates of *The Advertiser* and *The Register*.

1911-12.	Government Statist, Nov. 29th, 1911.	<i>The Advertiser</i> , Nov. 8th, 1911.	<i>The Register</i> , Nov. 18th, 1911.
	Acres.	Acres.	Acres.
Area under crop	2,578,740	2,508,631	2,558,882
Area to be reaped for wheat...	2,168,700	2,158,631	2,195,894
Area to be cut for hay	410,040	350,000	362,988
	Bushels.	Bushels.	Bushels.
Aggregate wheat yield	20,680,640	18,811,437	20,302,224
Average per acre	9.54	8.42	9.2
	Tons.	Tons.	Tons.
Aggregate hay yield	477,420	—	381,137
Average per acre	1 ton 3cwts.	—	1 ton 1cwt.

In most of the divisions the season has been exceptionally dry, and the fact that, notwithstanding this, the Government Statist has been enabled to place his estimate at such a comparatively satisfactory figure is undoubtedly due to the improved methods of cultivation adopted generally by South Australian farmers. The report shows that the total acreage under crop is 137,584 acres more than last season, and that the estimated production of grain is less by 3,664,100bush. and of hay more by 13,372 tons than in 1910-11. A decrease in the average yield of grain is forecasted for all the divisions of the State with the exception of the Western, the estimated average for the whole of the State being 9.54bush. per acre as against 11.57bush. in the previous season. In view of the exceptional dryness of the season (states the Government Statist) and that many crops were sown on new land, the precaution has been taken to considerably modify the numerous reports; but even after doing so, with favorable harvesting weather, the results predicted should be fully realised.

The following shows the estimated averages per acre for each division in comparison with the actual for the previous season:—

Division.	Averages per Acre.	
	Grain. Bushels.	Hay. Tons.
Central	9.57 (11.77) ..	1.24 (1.46)
Lower North	12.05 (13.65) ..	1.40 (1.51)
Upper North	6.77 (11.87) ..	0.84 (1.34)
South-Eastern	7.58 (10.14) ..	0.82 (1.16)
Western	8.86 (8.79) ..	0.96 (0.85)
The State	9.54 (11.57) ..	1.16 (1.38)

ESTIMATE OF THE WHEAT HARVEST, 1911-12.

Estimate of the Area under Wheat, and the Probable Yield of Grain and Hay for the Season 1911-12, also the Actual Area and Yield for the Season 1910-11.

Counties.	Area Under Wheat.					Yield.					Average Grain per Acre	
	Actual Area, 1910-11.			Estimated Area, 1911-12.		Actual, 1910-11.		Estimated, 1911-12.		Actual, 1910-11.	Estimated, 1911-12.	
	Total.	Grain.	Hay.	Total.	Grain.	Hay.	Grain.	Hay.				
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Bushels.	Tons.	Bushels.	Tons.	Bushels.	
I. CENTRAL —												
Adelaide	54,930	15,204	39,726	55,410	13,990	41,420	159,751	64,253	135,550	66,240	10,51	9-69
Albert	63,145	58,171	4,974	67,100	57,600	9,500	510,154	5,260	331,200	4,960	8-77	5-75
Alfred	44,426	40,094	4,332	47,400	43,250	4,150	532,170	6,650	387,870	3,020	13-27	8-97
Carnarvon	3,699	3,443	256	3,860	3,500	300	11,716	214	15,700	300	3-40	4-49
Kyre	74,628	63,591	11,037	71,500	55,080	16,420	734,714	13,094	379,180	12,040	11-55	6-88
Ferguson	152,247	142,644	9,603	155,740	143,490	12,250	1,904,675	12,954	1,664,500	17,250	13-35	11-60
Gawler	149,176	123,863	25,313	159,600	122,300	28,300	1,558,952	40,368	1,340,420	33,550	12-59	10-06
Hindmarsh	31,325	24,104	7,221	34,520	22,240	10,280	188,594	8,932	773,500	10,870	7-82	7-80
Light	133,800	90,470	37,330	139,880	92,300	47,580	1,280,005	57,846	1,078,990	70,410	13-27	11-69
Sturt	77,906	66,658	11,248	78,880	62,520	16,360	582,145	11,737	392,360	12,840	8-73	6-28
Total	785,282	634,242	151,040	802,830	616,270	186,560	7,462,936	221,208	5,899,270	231,480	11-77	9-57
II. LOWER NORTH —												
Burra	28,123	23,541	4,582	30,600	24,950	5,650	390,637	6,208	295,720	5,210	16-59	11-85
Daly	245,500	224,596	20,904	251,220	228,000	23,220	2,792,231	28,386	2,357,520	25,070	12-43	10-34
Hamley	971	170	801	910	910	930	1,500	729	1,500	600	8-82	—
Kimberley	16,162	14,017	2,145	17,380	15,030	2,350	167,130	2,426	148,090	2,300	11-92	9-85
Stanley	194,372	169,485	24,887	203,600	173,000	28,600	2,523,463	39,528	2,231,500	40,500	14-89	12-75
Victoria	164,339	134,553	30,286	181,450	146,550	34,900	1,868,492	49,322	2,102,320	60,540	14-04	14-35
Young	5,864	5,279	585	5,920	5,380	540	37,915	734	34,970	430	7-18	6-50
Total	655,831	571,641	84,190	691,100	594,910	96,190	7,501,368	127,333	7,170,120	134,740	13-65	12-05

ESTIMATE OF THE WHEAT HARVEST, 1911-12—continued.

Estimate of the Area under Wheat, and the Probable Yield of Grain and Hay for the Season 1911-12, also the Actual Area and Yield for Season 1910-11—continued.

Counties.	Area under Wheat.				Estimated Area, 1911-12.				Yield.				Average Grain per Acre.	
	Actual Area, 1910-11.		Hay.		Grain.		Hay.		Actual, 1910-11.		Estimated, 1911-12.			
	Total.	Grain.	Hay.	Total.	Grain.	Hay.	Total.	Grain.	Hay.	Grain.	Hay.			
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.			
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.			
III. UPPER NORTH—														
Blackford	8,752	7,799	953	7,050	6,600	450	450	64,205	957	170	14,200	170	8-23	2-15
Dalhousie	99,695	81,642	18,053	96,200	76,500	19,700	19,700	1,004,687	23,867	19,050	576,500	19,050	12-31	7-54
Derby	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Frome	124,103	106,975	17,128	118,300	101,500	16,800	16,800	1,403,153	25,362	14,670	429,250	14,670	13-12	8-17
Granville	15,547	13,976	1,571	11,300	10,650	650	650	126,453	1,708	320	32,300	320	9-05	3-03
Hanson	25,141	21,699	3,442	24,100	20,000	4,100	4,100	165,177	3,634	74,200	1,550	1,550	7-61	3-71
Herbert	8,613	7,707	906	9,250	8,200	1,050	1,050	105,050	1,127	53,300	1,250	40	13-63	6-50
Lytton	101	—	101	40	—	40	40	—	08	—	—	—	—	—
Newcastle	31,772	28,222	3,550	29,850	25,380	4,470	4,470	312,160	4,607	2,560	104,440	2,560	11-06	4-12
Taunton	218	—	218	—	—	—	—	—	401	—	—	—	—	—
Total	313,942	268,020	45,922	296,090	248,830	47,260	47,260	3,180,885	61,761	39,610	1,684,190	39,610	11-87	6-77
IV. SOUTH-EASTERN—														
Buclench	48,134	46,082	2,052	56,400	48,780	7,620	7,620	375,518	1,797	4,180	263,680	4,180	8-15	5-41
Buckingham	28,955	27,502	1,453	30,400	28,180	2,220	2,220	292,551	1,551	1,460	235,590	1,460	10-04	8-36
Cardwell	3,106	2,908	198	6,500	6,100	400	400	17,525	143	300	33,000	300	6-03	5-41
Chandos	144,754	133,220	11,534	158,500	141,000	17,500	17,500	1,580,943	15,655	16,000	1,177,200	16,000	11-87	8-35
Grey	13,856	11,924	1,912	12,600	10,540	2,060	2,060	112,138	2,498	3,070	112,800	3,070	10-40	10-70
MacDonnell	9,046	8,464	582	8,920	7,540	1,380	1,380	54,330	520	1,590	62,160	1,590	6-42	8-24
Robe	9,634	8,468	1,166	10,150	8,500	1,650	1,650	62,137	929	1,650	59,870	1,650	7-34	7-04
Russell	27,342	24,751	2,591	29,530	25,000	4,530	4,530	174,715	2,221	2,540	146,000	2,540	7-06	5-84
Total	284,807	263,319	21,488	313,000	275,640	37,360	37,360	2,669,857	25,014	30,790	2,090,300	30,790	10-14	7-58

V. WESTERN—											
Buxton	120	60	250	50	200	988	65	400	1,000	16.47	8.00
Duffrin	8,108	7,438	9,540	9,000	540	57,687	474	78,800	3,550	7.73	8.76
Flinders	82,334	72,331	106,390	94,800	11,590	593,143	8,349	820,970	11,500	8.20	8.66
Hopetoun	9,792	8,964	12,230	11,300	930	7,507.3	461	101,400	670	8.37	8.97
Jervois	107,337	98,063	132,000	118,500	13,500	966,165	8,807	982,360	10,400	9.24	8.29
Kintore	24,100	22,763	26,750	24,990	1,760	117,052	712	246,930	1,510	5.14	9.88
Le Hunt	490	355	500	360	140	3,700	102	3,240	70	16.42	9.00
Manchester	235	135	110	—	110	1,140	61	50	50	8.44	—
Musgrave	24,978	21,105	30,640	25,330	5,310	203,161	3,511	225,690	4,490	9.58	8.91
Robinson	66,007	61,819	71,590	67,500	4,090	598,774	3,785	668,920	3,820	9.69	9.91
Way	77,673	74,397	85,120	80,700	4,420	673,211	2,381	702,900	3,660	9.05	8.71
York	60	15	600	520	80	600	24	5,150	80	13.33	9.90
Total	401,294	367,495	475,720	433,050	42,670	3,229,694	28,732	3,836,760	40,800	8.79	8.86
SUMMARY.											
I. CENTRAL	785,282	634,242	802,830	616,270	186,560	7,462,936	221,208	5,899,270	231,480	11.77	9.57
II. LOWER NORTH	655,831	571,641	691,100	594,910	96,190	7,801,368	127,333	7,170,120	134,740	13.65	12.05
III. UPPER NORTH	313,912	268,020	296,090	248,830	47,260	3,180,885	61,761	1,684,190	39,610	11.87	6.77
IV. SOUTH-EASTERN	284,807	263,319	313,000	275,640	37,360	2,669,857	25,014	2,090,300	30,790	10.14	7.58
V. WESTERN	401,294	367,495	475,720	433,050	42,670	3,229,694	28,732	3,836,760	40,800	8.79	8.86
Total	2,441,156	2,104,717	2,578,740	2,168,700	410,040	24,344,740	464,048	20,680,640	477,420	11.57	9.54
Increase	—	—	137,584	63,983	73,601	—	—	—	13,372	—	—
Decrease	—	—	—	—	—	—	—	3,664,100	—	—	2.03

L. H. SNOLL, Government Statist.

Statistical Office, November 29th, 1911.

DISEASES OF FARM ANIMALS.

BY OFFICERS OF THE STOCK DEPARTMENT.

Diseases of the Urinary, Reproductive, and Nervous System.

(Continued from page 379 of the November issue.)

The various forms of diseases which affect the urinary, reproductive, and nervous systems of farm animals are those which tax the highest skill and most careful study on the part of the veterinarian, and yet most people sum them up in an offhand way as "stoppage of the water, inflammation inside, and staggers." The three systems are so closely allied in their physiological functions that to divide the diseases into groups as they attack the one or the other is a more or less arbitrary method; yet it has the advantage of somewhat simplifying the explanations, and will be adopted in this article.

DISEASES OF THE URINARY SYSTEM.

The most striking symptom which the stockowner usually notices is that the flow of urine is either too profuse or too scanty, more often the latter. When this is the case, and the urine is thick and stringy like the white of an egg, there is probably advanced disease of the kidneys and bladder, and veterinary aid should be summoned without delay, because it is a curious fact that the diseases of these three systems which offer the most apparently alarming symptoms are really the least to be feared, while those in which the symptoms do not seem to demand much attention are those in which insidious disease is most likely to have a fatal termination; and the stringy white substance is probably derived from the cells which line the minute tubes of the kidneys, without which these organs cannot remove the waste which is slowly poisoning the whole system. Nitre and such stimulants are not to be recommended, although at first they seem to afford relief; but pending skilled advice it will be well to keep the bowels loose and let the patient have plenty to drink, with linseed or bran tea, which soothe the kidneys and bladder.

If the urine is thick and creamy there is probably disease in one of the kidneys or in the bladder; if the former there will be increase of temperature and pain on pressure over the loins, with occasional colic. Copious supplies

of pure drinking water, with plenty of linseed or bran tea, will be useful in this case also, while the veterinary surgeon will be able to locate the disease and prescribe suitable drugs; or will probably wash out the bladder if he finds it is in that organ, and apply suitable remedies locally. Dropsy is frequently a symptom of urinary trouble, and when it is present it will be well to limit the quantity of drinking water, though still giving demulcent drinks, of which marshmallow tea is one of the best.

Azoturia, or black water, in the horse is a serious condition, in which the whole of the urinary tract is involved. One of the early symptoms is a darkening and thickening of the urine, which, in severe cases, resembles thick coffee; the horse is in great pain and sweats profusely, while the hind quarters become paralysed. The disease is associated with too high feeding on heavy nitrogenous foods, amongst which lucerne should be noted. It is a disease in which professional aid should be sought early; but in the meantime the diet should be reduced to the lightest and most digestible. The bowels must be stimulated to take off as much work as possible from the kidneys, and wherever possible the horse must be made to walk, even if he has to be supported.

When the urine is thick and sandy, and is passed painfully in jerky jets while the animal straddles and groans, one may be sure that there is a stone or sand in the bladder; and if there is a great deal of pain and possibly blood with the urine, there may be a stone in the kidney. These conditions require skilled aid, but relief may be given in the meantime by flushing the system with plenty of demulcent drinks, which may contain bicarbonate of soda (baking soda), or, better, the same salt of potash; and opium and camphor, especially the latter, will allay the pain, while the bowels must be stimulated to work by salts such as hyposulphite of soda.

Bites and stings on the external parts of the urinary organs and within the sheath give rise to alarming symptoms owing to the enormous swelling which usually accompanies them, and which often runs along the belly and down the legs. A thorough examination of the parts should be made in case flies have laid their eggs, which would develop into maggots, and plenty of bathing with hot water, to which a little washing soda or a few drops of household ammonia have been added, will generally set matters right; but if the urine is persistently withheld owing to the pain, camphor, sweet nitre, or hot gin may be given to increase the flow, with demulcent drinks. Inflammation of the bladder may be either acute or chronic; in either case the animal will lose condition rapidly, and in the latter the urine will, after a time, be constantly dribbling away. Opiates, potash salts, and demulcents are called for, but are best given under veterinary direction.

Occasionally in mares irritation of the bladder or of the neighboring parts causes that organ to be turned inside out—a painful condition which requires surgical aid to put right, and which may be recognised by a pinkish purple

mass inside or even protruding between the lips of the bearing, from the sides of which the urine is ejected in two tiny streams. Should such an accident be noticed, the damaged organ should be carefully cleansed with a weak solution of Condry's crystals or other non-irritating agent, and well lubricated with carbolised vaseline, and gently but firmly pressed continuously from its centre till it turns inside like the finger of a glove. Afterwards the animal must be kept on a laxative diet, with demulcent drinks and soothing drugs.

An excessive flow of urine, if of long standing, points to diabetes, a disease which destroys the tissue of the kidneys. Relief may be obtained by certain drugs, which should be prescribed by a veterinary surgeon, while the drinking water must be restricted in quantity and demulcent drinks substituted for it, and the diet must be of the lightest kind.

Difficulty in passing the urine frequently arises, not from general disease of the kidneys or bladder, or from the presence of stones in the urinary tract, but from some mechanical obstruction, which is spoken of as a stricture and which frequently follows an injury, such as may occur to a stallion during service. For the treatment surgical aid is generally required, but soothing drinks, free supply of water, camphor and other diuretics, help a passage by increasing the amount of urine secreted.

It will be seen from the foregoing notes that the successful treatment of urinary diseases is not a matter for an amateur to undertake without considerable risk of failure; but the application of common sense, strict cleanliness, and a few every-day household drugs will be of the greatest help to the veterinary surgeon in attendance; but his chance of success will be much greater if he is called in early, for when these diseases are well advanced the chance of a successful cure is considerably lessened, and the work involved in their treatment, as well as the expense, greatly increased.

DISEASES OF THE REPRODUCTIVE SYSTEM.

Abortion is one of the most common and costly of the diseases of the reproductive system. This failure to carry the young till the full term is often due to a nervous shock or some general systemic disturbance, such as poisoning.

Abortion generally upsets an animal considerably, and it is well to cleanse the system by keeping the bowels well open and feeding very lightly until all untoward symptoms have disappeared. If local treatment seems necessary, a weak injection of lysol or similar disinfectant may be given.

Retention of the afterbirth is another troublesome condition, and in the mare, if the membranes have not come away within a few hours of birth, they should be removed. The womb should be well flushed out with a solution of lysol or similar preparation, and the membranes carefully separated from it, while steady traction is kept up on the external part. After removal

the womb must again be flushed out, and hyposulphite of soda with ginger and warm gin are useful medicines for cleaning and restoring tone to the system.

Straining and flooding often occur after birth. If not severe they may be dealt with by keeping the bowels open and giving soothing medicine such as laudanum; but if severe and long continued, local astringent injections will be required, which may be prepared by using lysol or izal as strong as 5 per cent., and adding the juice of a lemon to each quart of water used. In preparing injections for flooding, the water should be between 95° F. and 100° F., or as hot as can be borne by the point of the elbow. Severe straining is sometimes followed by inversion of the womb or vagina, in which case the protruding organs should be immediately cleaned with a weak solution of lysol; and in the case of a womb a clean sheet should be kept under it to prevent its being damaged by dirt, grass seeds, &c., pending the arrival of veterinary help, failing which it should be well lubricated with carbolised vaseline or clean lard, and, by constant steady pressure on the end, it should be turned in like a glove and followed by the hand and arm till it is well in place, when another clean sheet soaked in lysol solution should be all inserted in the womb until that organ can be felt to contract on it, when it may be slowly withdrawn. The animal should be well propped up behind so that the hind quarters are much higher than the fore, and kept in this position till all straining is over.

These affections may be accompanied by leucorrhœa, shown by a glairy white discharge, and has to be treated through the system, as well as locally, by perchloride of mercury solution 1-2400.

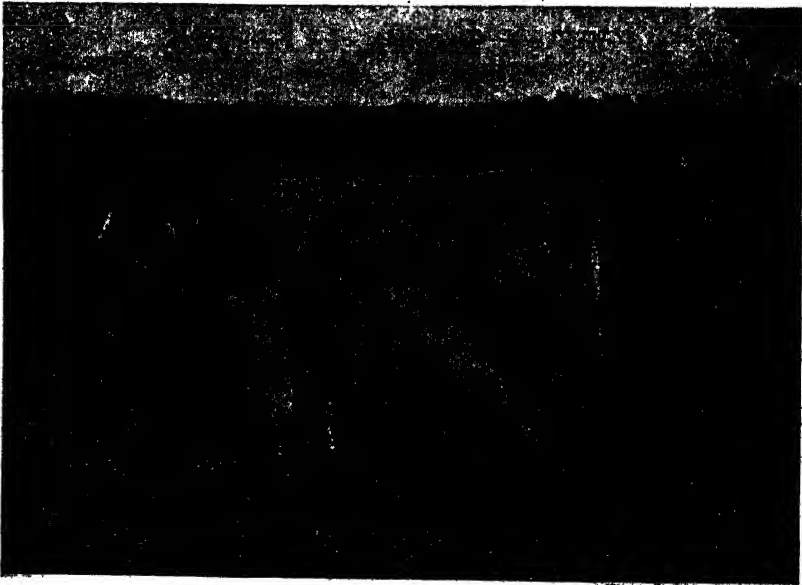
Soon after birth the udder is subject to various forms of inflammation, which result in loss of milk, or blood appearing in the milk, or in inability to retain the milk. The bloody appearance is most frequent in young dams, and usually yields to treatment in the form of cooling medicine such as Epsom salts or treacle. The milk may be prevented from running away by seeing that the udder does not become overstocked, and giving iron as a tonic—a drachm of the sulphate twice a day. The various forms of mammitis require more energetic treatment, both local and systemic, in the form of repeated fomentations with hot soapsuds and the injection into the affected quarters of a 4 per cent. solution of boracic acid twice a day, and cooling medicine internally, especially hyposulphite of soda.

Diseases of the penis often result in inability to protrude or retract that organ, and immense painful swelling results in either case, which is best relieved by frequent fomentations with warm soapsuds. Should the inflammation extend to the testicles there may be both orchitis and hydrocele, a filling of the scrotum with inflammatory exudate, which will require veterinary aid, but frequent fomentations and suspension of the organs, whereby the dragging weight is relieved, will assist in recovery.

Swelling of the cord after castration, resulting in a permanent thickening from which there is a constant discharge of matter, is known as scirrhus cord, and requires surgical treatment; but in the meantime iodide of potassium internally and iodised phenol locally will help to keep it in check.

The various forms of rupture affecting the male reproductive organs and the navel all require surgical treatment; but it is well to seek advice early, and in the majority of cases the veterinary surgeon will keep the animal under observation while nature effects a reduction of the swelling, while in the few which require more active intervention he will be able to choose the proper time to operate. The castration of rigs, animals in which one or both testicles have failed to descend into the scrotum, is purely a matter for skilled veterinary aid.

(To be continued.)



"Blue Ribbon of Turrettfield."

THE CURRANT INDUSTRY.

WIRE NETTING RACKS FOR DRYING.

By GEO. QUINN, Horticultural Instructor, &c.

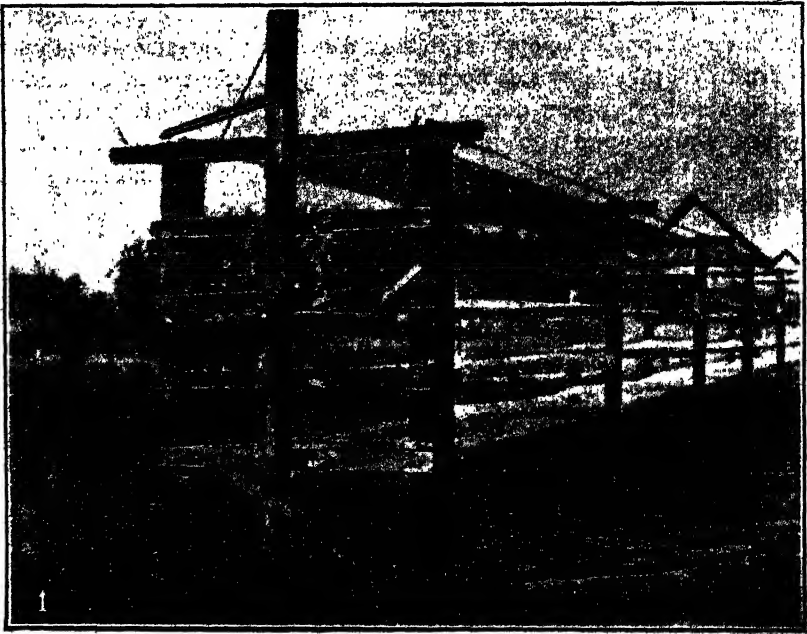
The subject of drying currants upon racks made by stretching wire netting upon various supports, as opposed to the old system of spreading them upon wooden trays laid side by side upon the ground, has been the cause of much discussion and experiment during the past season or two, more particularly among the most up-to-date producers in the Mildura irrigation area. Inquiries have been filtering in to this branch from time to time indicating that in a small way, at any rate, our South Australian currant-growers are becoming alive to the possibilities contained in the idea. When visiting Mildura last year the writer was struck with the many devices tried by various growers with a view to attaining the same object, and, through the courtesy of the proprietor of the *Mildura Cultivator*, now reproduces some excellent photographs of racks, with descriptions abridged from the interesting articles contributed to that paper in respect to these pictures by Mr. W. B. Periam.

It is claimed that these racks, judged from the superficial area covered, are not only vastly more economical in construction, but much more so in manipulation. The fruits are unloaded on to the racks direct, and, being suspended in such a manner that the air plays all around the bunches, no turning operations are needed. Further, as the racks are covered, no tedious stacking need be performed with feverish haste, and that frequently at overtime rates of pay, on the approach of a threatened storm. It may also be claimed that a drying ground of probably not more than one-fourth the area needed for trays will suffice under this system. This in itself on comparatively small irrigation blocks, where every square foot of land surface is of appreciable value, commends the practice as worthy of consideration.

As far as the effect upon the fruit itself is concerned, doubtless a more uniform sample, in so far as color and texture is concerned, is obtainable where the currants are dried in the shade. To this conclusion has all of the experiments tended to lead the Mildura growers of currants, and apparently they are not originating, but only rediscovering to Australian producers, an established practice in older lands. In some notes made on the spot upon the manipulation of Greek currants and published in the August number of this *Journal* of last year, Professor Perkins wrote—"I am informed that in Volstizzia (where the best Grecian currants are produced) there is a tendency

to dry the currants in the shade under a shed. They are placed in open wire trays and are piled up one above the other, with plenty of room both above and below for air. When the autumns are sufficiently warm for the purpose currants dried in the shade are of superior quality. They are said to be softer, more elastic, and of better general appearance. On the other hand, they are apt to rot in the event of cold weather setting in before the drying process has been completed."

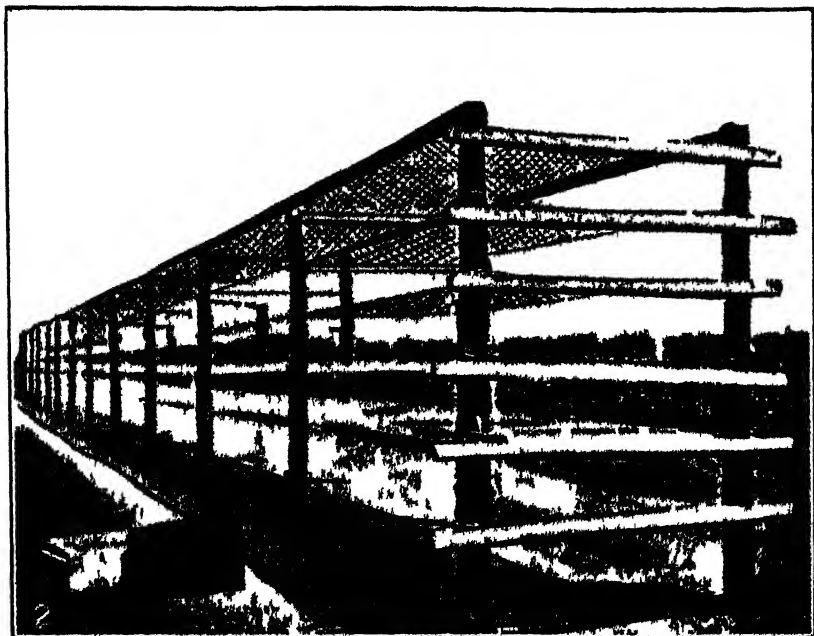
Judging from the experience of the Mildura experimenters last year, damp as it was, this last-named contingency need not be taken into consideration



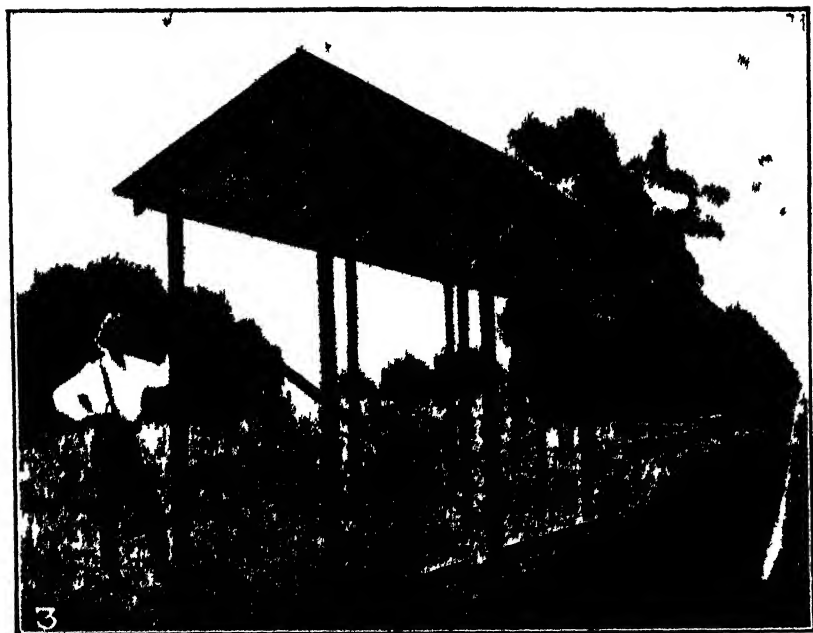
Mr. H. Hollick's Rack.

in the valley of the Murray, were reasonable care exercised in spacing the racks, but in some of the moister and later districts it should not be wholly ignored as yet.

Referring to our Mildura views, No. 1 is a rack 100ft. long, used by Mr. Herbert Hollick, of Irymple Avenue. It is fitted with racks of netting 42in. wide, 2in. mesh. The posts and cross pieces explain the general structural outline as far as the woodwork goes. Each tier of netting is supported upon four longitudinal wires in addition to the cross pieces of wood which brace each pair of posts. Each of these wires is supplied at one end with a straining roller to tighten it up from time to time. The five tiers are 14in. apart and the bottom one 18in. from the soil. By means of the gable pieces fixed to



Mr H A Johnson's



Mr C Gair's

the tops of each pair of posts, three wires—one along each side and one along the apex—are strained and a calico or hessian roof is fixed by means of eyelets rings, which, sliding on the wires as in No. 8, permit the roof being telescoped in sections. Similar blinds may be fixed to the side wires, and these, during rainy weather, can be run along into position to protect the fruit from driving showers.

No. 2 is a slightly different rack, built by Mr. H. A. Johnson, Koorlong Avenue. It is 150ft. long, and contains six tiers of 3ft. netting, each 1ft. above the other. This structure would be roofed as described for No. 1, but the



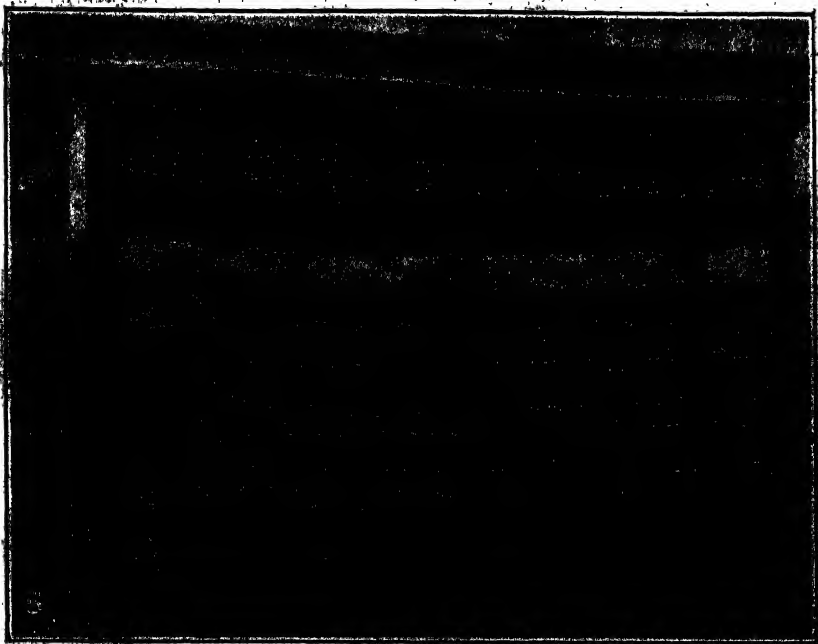
Mr. W. B. Chaffey's.

essential differences in its design are the side braces of wood along the tops of the posts, which does away with the end bracings seen in No. 1. Each tier of the netting is also fixed to rollers, so that it may be tightened up, and instead of a cross brace of wood supporting the netting at each pair of posts wires are drawn across.

No. 3 is a more expensive structure, being prepared by Mr. C. Gair, Seventeenth Street. It, after completion, contains 12 tiers of netting 6ft. wide, made up of two rolls, each 3ft. wide, stretched side by side. This rack is 66ft. long, cut into six divisions each 11ft. long. It is 9ft. 6in. high in the centre, the galvanized-iron roof having a pitch of 2ft. The posts are 4in. by 4in. red gum sunk 3ft. in the ground. The netting is supported by cross bars

between each set of posts. As the tiers of netting are so closely placed, a shallow zinc tray has been used by which to spread the fruit upon the racks, there not being sufficient space between the racks to permit the insertion of the ordinary picking buckets or baskets.

No. 4 is a 300-ft. long rack, 6ft. wide, made up of two 3-ft. wide rolls of netting, supported on longitudinal wires as used by Mr. W. B. Chaffey on Belar Avenue. The feature of this rack is the roofing of curved galvanized iron; and No. 5 gives a closer view of how thickly the currants are piled upon the racks, which are 12in. apart, and how it hangs suspended half way



Mr. Chaffey's Rack Filled with Currants.

through the mesh of the netting, allowing such a splendid play of air all around the berries, thus allowing it to carry the moisture clean away.

No. 6 shows how a permanent shed has been fitted with racks by Mr. J. Lockwood. This shed is 60ft. long and 17ft. 6in. wide. It contains three racks, the outside ones being 4ft. and the middle one 3ft. 6in. width, whilst the aisles, each 3ft. in width, are retained. The netting shelves are 18in. above the ground, the lowest being 18in. above the ground. The poles seen in front are erected to take some of the strain off the building. The racks in this structure are movable, being pushed up and kept above out of the way by pegs until wanted, when each one is lowered into position in turn and filled before the next one is brought down. It is said the materials in this

shed cost £25, and its present racks possess a superficial area of 4,620 sq. ft., or equal to that provided on 256 trays, each 6ft. by 3ft. This, however, is hardly a fair comparison, as the fruit can be spread pretty well twice as thickly on netting racks as upon trays. It is claimed that an average picking bucket holds 17lbs. of green fruit, and this can be spread upon 3 sq. ft. of netting surface. The shed referred to above would hold on its racks 1,540 buckets, or 26,180lbs. of fresh grapes, which drying out, as it is claimed they do under these conditions, from three to one, equals 8,726lbs. of dried currants.



Mr. J. Lockhead's.

No. 7 shows the calico cover as used by Mr. M. B. Considine upon a low four-tier rack, and at the side may be seen the fruit being finished on hessian. Some growers adopt this practice, but others do not consider it is necessary, and dry the fruit on the racks until it can be rubbed through the netting, when it falls upon hessian spread upon the bottom rack or upon the ground beneath the racks. Some have placed ordinary drying trays upon the ground beneath the racks to catch the loose berries which fall through the netting during the operations of spreading and drying the fruit.

No. 8 conveys a clearer idea of the use made by Mr. W. B. Chaffey in raisin-drying of the calico coverings over trays laid upon the ground—first

used, it is said, by a Mr. Forbes in Mildura as a protection against rain storms instead of stacking the trays.

Since the foregoing notes were written the Renmark Fruitgrowers' Association has been presented with a report from the delegation appointed by that body to visit Mildura and inquire fully into this subject. Through the courtesy of the Editor of the Renmark *Pioneer* I append the recommendations made by the delegates, as they not only confirm all the advantages claimed for this method of drying currants—with a possible extension to other grapes for raisins—but give specifications of racks considered most suitable in size



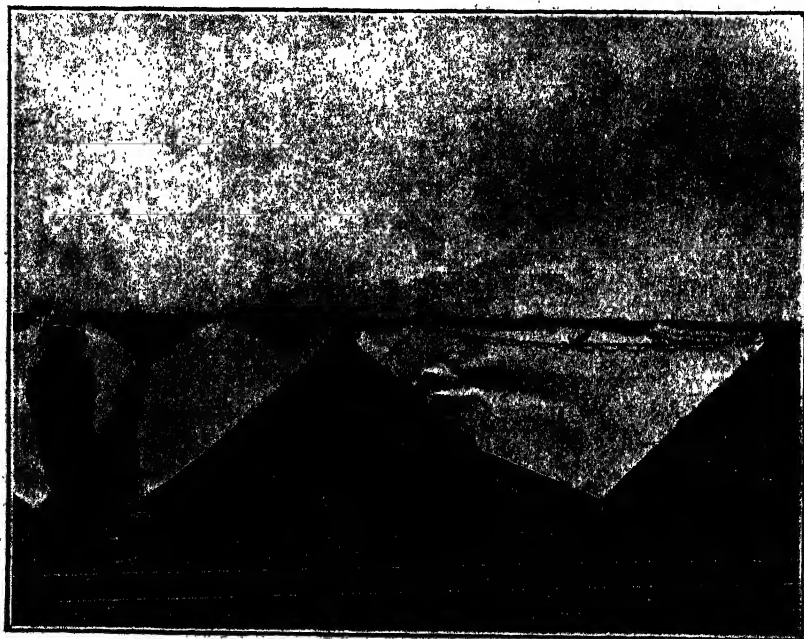
Mr. M. B. Considine's.

for various purposes and conditions. The delegates—Messrs. Muspratt, McDougall, and Howie—are educated, progressive men, who are not only capable of forming and expressing a competent opinion upon such matters, but have proved under the older methods of producing dried fruit what a high standard of quality it is possible for the Renmark produce to reach. The former has shown over and over again that he can raise and put up raisins unsurpassed in Australia.

It will be noted considerable stress is laid upon the rack with movable shelves. One advantage claimed is that it facilitates the spreading of the fresh fruit, and another that the tiers of netting may be adjusted closer or wider apart, as the weather conditions or kinds of fruit or condition of the

fruit demands. It has been claimed that if the currants, under ordinary summer weather, can be spread in the sun for a day and then put in the shade to finish slowly, a better class of fruit is obtained. Mr. Muspratt points out in a discussion upon this report how this may be attained where large or lengthy structures are made by filling one shelf only each day.

The writer is disposed to suggest that the side posts be not wider than 5ft. or 6ft. apart, and that loose cross bars, either of wood or iron, which shall be held in position by means of iron pegs which pass through holes bored in their ends and through corresponding holes in the posts be used. Each of the



Forbes' Covers at Mr. Chaffey's.

tiers would then have the weight of its load distributed in 5-ft. lengths. These holes in the posts may be 4in. apart, thus giving a choice of 4in., 8in., 12in., 16in. apart for the fixing of the netting racks, as the purpose and weather conditions may demand. In the illustration No. 2 Mr. Johnson has probably given the germ of an idea to those of a mechanical turn of mind, whereby the tiers of netting may not only be tightened, but be wound around a roller-like drum when being emptied. A revolving brush could be possibly fixed to assist in clearing any of the bunches which, having fallen partly through, had become entangled in the mesh of the netting. Those racks fitted with galvanneal roofs may possess the advantages of permanency, but the adjustable cover holds its own and is much more amenable to adjustment when

the drier is desirous of taking advantage of the direct sunshine. In making covers for enclosing citrus trees for fumigation purposes it has been proved conclusively that two 3-ft. widths seamed together stand more wear and tear than one 6ft. width. It is possible for the purpose of covers for drying racks the same proof may hold good.

RECOMMENDATIONS OF RENMARK COMMITTEE.

The following are the recommendations of the Renmark Committee:—

(a) A drying rack suitable to all classes of grapes.

(b) A currant-drying shed.

DESCRIPTION OF PROPOSED RACK A.

Length—50yds., divided into 15 panels of 10ft. each.

Wire netting—4ft. width, 2in. mesh, in four tiers 15in. apart, the lowest tier being 18in. from the ground.

The posts can be of any shape, 5ft. 6in. above the ground and 2ft. below, whilst at each end and in the centre longer posts (10ft., 8ft. out of the ground) are needed to run the sliding cover on.

The tiers of netting are fixed at each end to a piece of 3in. x 3in. red gum 5ft. long, by turning the netting back and fastening it by a piece of bucket handle wire (No. 6) threaded through the netting. The 3in. x 3in. end pieces are fixed at one end, and at the other end fastened by wire to Walker strainers, in order to allow for straining up the netting when the load is on. At each pair of posts the netting is supported by twitched No. 10 wire, whilst the cross pieces at the top of the posts consist of 3in. x 2in. red gum entered into the posts.

The cover consists of 12½-yd. lengths of 80-in. unbleached calico, which draws back to the ends and the centre. This cover runs on three wires and is fixed to them by rings of No. 1 galvanized wire 18in. apart. It is drawn in and out by clothes lines fixed to the calico. In addition to the cover, a hessian curtain can be hung on either side for protection from driving rain.

The capacity of the rack, if the fruit is spread one box (28lbs.) to 5 sq. ft., is 100 boxes of green fruit, or approximately 35cwts. of dry fruit.

Prices are at the present moment being obtained for the posts, netting, and covers. We estimate the cost of this rack erected to be about £11 10s. It is interesting to note that trays to spread the same amount of fruit at two and a half trays to the box (1,200 trays at £4 4s.) would cost £50 8s.

MATERIAL REQUIRED FOR THE CONSTRUCTION OF DRYING RACK A.

Netting—200yds. of 2in. mesh 4ft. wire netting; by preference of 17 gauge.

Posts—30 7ft. 6in. posts, four 10ft. posts.

Timber—red gum or jarrah; eight pieces of 5ft. 3in. x 3in., end pieces; 14 pieces 5ft. 6in., 3in. x 2in.; three pieces 6ft., 4in. x 2in., cross pieces.

Wire—1,115yds. Resisteel for tiers; 280yds. No. 10 block wire for supports; 160yds. galvanized wire for covers; eight pieces galvanized No. 4 wire in 4ft. lengths.

Cover—50yds. of 80in. unbleached calico; 150yds. of clothes line; 200 galvanized iron rings (No. 4 gauge).

Strainers—11 Walker strainers. No allowance for deadman stays.

CURRENT-DRYING SHED B.

Dimensions 60ft. x 20ft., divided into six bays of 10ft. The height above the ground is 7ft., whilst the centre longer posts are required to carry the roof. The wire netting is arranged in three racks of from seven tiers at 1ft. apart to 14 at 6in. Probably the most suitable distance apart for currants would be so as to give 10 tiers on each rack. The whole is covered under a permanent iron roof. All the tiers of netting are movable, as the end pieces slide on the outside posts and are loose between. When in position they are held in place by being strained up, and at each post the cross supports rest on $\frac{1}{2}$ in. iron pegs. The cross supports for the netting can easily be made out of straight mallee stakes 5ft. long.

The estimates of quantities are included in this report, and until prices are obtained it is not possible to give the cost, but it should be about £35. The capacity at 5 sq. ft. to the box is roughly $5\frac{1}{2}$ tons, if 10 tiers to each rack are used. Trays to spread a like amount would run into £160. The supports for both rack and shed should be logs sunk 4ft. under the surface, to which the end posts are stoutly wired back.

SPECIFICATIONS.

Timber, framework (gum or jarrah), 10 pieces 10ft. 6in., 4in. x 4in.; 20 pieces 9ft., 4in. x 4in.; eight pieces 9ft., 6in. x 6in.; four pieces 10ft. 6in., 6in. x 6in.

End pieces for netting, gum or jarrah, 60 pieces 5ft., 3in. x 3in.

Cross pieces—150 pieces, straight mallee stakes suitable.

Roof timber (oregon)—girders, seven pieces 20ft., 5in. x 2in.; wall plate, 120ft., 4in. x 2in.; roof pieces, 28 pieces 12ft., 3in. x 2in.; 360ft., 3in. x $1\frac{1}{2}$ in.; ridging, 60ft., 9in. x $1\frac{1}{2}$ in.

Iron—60 sheets 6ft., 120ft. 4in. guttering, 60ft. ridge-capping.

Netting—650yds. of 4ft. wire netting, 2in. mesh (and 17 gauge preferred). Also 60 Walker strainers and 300 6in. iron spikes of $\frac{1}{2}$ in. iron. 2,000ft. of wire (Resisteel). No allowance for deadman supports or for clocks under posts used to prevent settling.

RACK WITH MOVABLE TIERS

A more economical form of rack is one constructed with movable tiers of wire netting. The advantages of this type would be the adaptability for

both currants and sultanas. The principle on which it would be worked is to have the tiers of netting, say, 8in. apart to begin the season upon which currants should be spread, and then if required for Sultanias or Gordos every other tier could be removed, so giving the extra space required for these fruits.

A regards the construction of such a rack the details require some further elaboration. We think that growers will better obtain information from inspection of a rack which Messrs. Basey and Howie intend to erect shortly. This rack will be 5ft. 4in. above the ground, with eight tiers 8in. apart. The netting will be removed by the means of a windlass, during which process no doubt an easy method of clearing the fruit could be adopted by means of brushes.

Another advantage the movable tiers present would be the ease of filling the rack ; for the netting would not be fixed in position until the tier below it was filled. We think growers would do well to consider this form of rack before making permanent fixtures of their wire netting.



HARVESTERS ON A LARGE FARM.

POULTRY NOTES.

By D. F. LAURIE, POULTRY EXPERT.

THE 1912-13 LAYING COMPETITIONS.

The Minister of Agriculture (Hon. J. P. Wilson, M.L.C.) has authorised a further test, and laying competitions will be held at the poultry stations Roseworthy and Kybybolite. These tests will begin on April 1st, 1912, and will terminate March 31st, 1913. As usual the prizes authorised by the Hon. Minister are very liberal. For the two competitions the total is £90. In each test there are two sections—No. I. Light Breeds, No. II. Heavy Breeds. In each section of both competitions the prizes for the greatest number of eggs laid are—1st prize, £10; 2nd prize, £5; 3rd prize, £3; 4th prize, £2; 5th prize, £1. In addition a special prize of £3 will be awarded to the pen which lays the greatest weight of eggs. To secure this prize not less than 1,100 eggs must be produced by a pen.

WHAT THE COMPETITIONS TEACH.

Value of Strain.—Perhaps the most important matter to the poultry-keeper is an accurate knowledge of breeding and its laws, and yet this is a much-neglected study. Egg production can only be made profitable under certain conditions, the chief of which is that a given number of hens shall average a certain number of eggs laid during a year. Even when a profitable average annual production is attained it by no means follows that perfection is reached. Quite the contrary. Averages are the result of the contributions of good layers and of bad layers. An analysis of the annual yield of each hen would show progressive improvement from bad to excellent. Recently many highly trained mathematicians have been at great trouble to prove by biometrical methods what was already understood, viz., that mass breeding, or breeding without selection of individuals, results in no improvement, whether the flock have a fairly high or only a medium average egg production. This matter has been the subject of endless discussion in America, both in scientific circles and among poultry breeders. As a member of the American Breeders' Association I have shown in the association's magazine the results gained in our laying competitions and by our leading breeders, thus emphasising the value of strain and selective breeding. This view is warmly approved by the breeders there.

Our laying competitions are proving that egg production is a matter of strain more than of breed. Experience has shown on many occasions that

a pen of White Leghorns may win while another pen may be almost at the bottom of the list. Why should that be so? All pens are housed alike, and have a sufficiency of proper food and are fed regularly. The reason is that the winning and other prominent pens of birds are bred to lay—they are members of laying strains or families. The poor layers are the progeny of parents, of a family of fowls, which have not been bred exclusively for egg production. When it is noted that the hens of a particular strain of fowls are prominent year after year, and in several laying competitions, we may assume that the strain producing such consistently good layers is the result of very careful selective breeding. As the public generally follows the results of the competitions it generally happens that those breeders whose pens are in a prominent position receive a great many orders for stock and eggs. Thus the distribution of high-class layers is assisted.

Foods and Feeding.—Old stock-breeders have a saying to the effect that half the breeding goes in at the mouth. The scientific methods of feeding adopted at the poultry stations are made public in the annual reports. The foods are simple and such as can readily be purchased. No spices and nostrums of any description are used and the hens are not subjected to any forcing method of feeding. Given hens of right age and of good laying strain, much will depend upon the food given and the methods of feeding. It must be remembered, however, that in laying competitions the methods of feeding adopted and the foods used are for the purpose of egg production, and are not entirely suited to growing stock to be used in time as breeders, nor for breeding stock in the stud pens. The publication of the feeding methods has been most helpful to breeders, who are universally adopting them.

Housing.—In the Roseworthy competition the fowls are accommodated in small houses with open runs attached. The houses are of a very simple character and provide temporary shelter at night, and sometimes, in very wet weather, during daytime. The fowls often are quite wet, and are at all times exposed to weather conditions. At Kybybolite, in the South-East, the use of scratching shed houses has been adopted; this was necessary owing to the cold nights and mornings and to the cold subsoil. The improvement in egg production has been most marked, and is the result of the warmer conditions due to the sheltered scratching shed houses. Visitors to the poultry stations are enabled to inspect the various systems of housing, and are thus guided when providing accommodation for their own stock. Even if the stock is bred to lay and are fed properly a very great measure of the egg yield depends upon comfortable, warm, dry housing and yarding in the winter.

PREPARING PULLETS FOR COMPETITIONS.

The age at which a pullet begins to lay depends upon many conditions. All things being equal, the main factor is that of strain. The pullets of some strains begin to lay at four and a half months old; others do not lay until

perhaps six months of age. Very early laying is not altogether desirable, because it stunts the growth and tends to diminution in the size of the eggs. It is advisable to shift the pullets very frequently so as to check the desire to settle down and lay. This results in a longer period of unchecked growth, and generally means more robust stock. It is very important that all competition stock should be well grown, as, on the termination of the test, these birds are sure to be used for stock production. Bearing in mind that there is great difficulty in timing the pullets to lay just about April 1st, it is advisable to have a series of hatches extending over three weeks, so that six of the right age may be selected to lay at the right period. A desire to encourage breeders in past years has resulted in the inclusion of many immature and backward pens of birds. These, in many cases, did not lay for weeks, and in some instances for months, after the starting date. The time is now ripe for dealing with this question, and I have decided to reject all such specimens. The inclusion of such pens spoils the averages, and as the precise reasons are, out of regard to the novice owner's feelings, not published, a large amount of uncertainty as to the cause of poor averages prevails. A serious error, on the other hand, is in forwarding pullets in full lay; this has been done repeatedly and not always by inexperienced breeders. For every reason it would be better if the pullets could be timed to be within a week of laying when forwarded to the poultry stations. It is a matter of knowledge that the act of reproduction is more or less accompanied by functional disturbances. Pullets just about to lay are in an abnormal condition of excitement, even in their own yards and undisturbed. If sent in this condition on long journeys, during which they are hustled about and are then penned in strange quarters adjoining hundreds of other strange birds, there is a general atmosphere of alarm and disquiet, and the results can but be undesirable. There are several ripe and maturing yolks in the ovary, and some of these may be shed elsewhere than into the oviduct, and thus great harm may occur. It is far better not to aim at a big score the first month. Such attempts end in a moult, which may spoil all chances. Our averages have been materially affected by such causes, and they are due to lack of appreciation on the part of breeders. The young stock should be kept growing steadily without check. If not doing well advice should be sought. Very often internal parasites check the growth and not infrequently cause death. Feed well on as great a variety of food as is obtainable and give abundance of greenfood. Do not use green cut bone, nor much meat or meat meal; do not, in fact, overfeed, and do not unduly force the stock.

When finishing the birds and, say, during the last fortnight or three weeks feed the pullets in the same manner as they will be fed at the poultry stations, viz.—7 a.m., mash made of two parts pollard, one part bran, one part cut greenfood mixed to a crumbly mass with hot water; midday, cut greenfood; 5 p.m., grain in straw or other scratching litter.

If so fed the pullets will settle down the more readily. They should also be accustomed to sleep in houses and on perches about a foot high. From the appearance of the new fowls after the start of a competition and for a few nights one has doubts if the housing of poultry is as general as it should be. Carefully treat the pullets so that they become tame; flighty, easily-scared pullets are a nuisance and very rarely lay well.

Attention to the above details should result most favorably. Between the time this article appears in print and the date of commencement of the test many difficulties may beset breeders. I shall be pleased to advise and do what I can to assist if breeders will write for information.

REGULATIONS AND ENTRY FORMS.

All poultry-breeders known as likely to enter a pen for either competition have had a copy of the rules and an entry form posted to them. If any reader desires to enter and has not received the above forms they will be sent on application to the Poultry Expert. The entry fee is 10s. per pen of six birds, which must be delivered at the Railway Station, Roseworthy or Kybybolite, as the case may be, carriage paid and addressed—"The Poultry Expert, ——— Railway Station. Section ———, Pen No. ———." If not prepaid or if otherwise addressed, no delivery will be taken. This rule will be strictly enforced. Roseworthy test is open to the world. Kybybolite test is strictly limited to breeders resident in the South-East; Bordertown is the northern limit. The sections are—

Section I.—Light Breeds, such as Leghorns, Minorcas, Andalusians, Anconas, Campines.

Section II.—Heavy Breeds—Orpingtons, Wyandottes, Langshans, Plymouth Rocks, Rhode Island Reds, Dorkings, &c.

OPERATIONS FOR DECEMBER.

SUMMER DISEASES.

The Drinking Water.—Although as yet only a few warm days have been experienced, a good many breeders are complaining of sickness among their poultry. In a number of cases an examination of the surroundings revealed sun-heated drinking water as a cause. Very often the water is in shallow pans or old tins, and when exposed to the sun soon becomes warm. Not only is drinking water in this warm condition a suitable medium for distributing disease germs, but it has also a physical effect upon the birds, and they drink too much in their endeavor to quench their thirst. The water vessels should be frequently scoured and disinfected, and when filled with clean water should be kept in absolute shade.

Bowel Troubles, Roup, &c.—Consequent on drinking sun-heated or dirty water, and owing to other causes, a good many cases of diarrhoea, dysentery,

enteritis, &c., occur, and cause much loss. Where the drinking water is thoroughly under control some other action may be necessary. For individual treatment of cases of the foregoing nature the administration of the following is to be recommended:—Materials—A supply of medical Izal, glycerine, and an 8-oz. medicine bottle with a good cork: these can be obtained from a chemist. Take two tablespoonfuls of glycerine, in which drop 40 drops of medical Izal (not the ordinary disinfectant); pour this in the medicine bottle and fill same with clean water. Shake well and give a teaspoonful to each bird daily, or twice or three times a-day in bad cases. Where a large number of birds are affected, mix a teaspoonful of medical Izal in a gallon of water, and use this daily in mixing the mash.

Diphtheria, Canker of Mouth, &c., may be cured by treatment as above, say, one dose a-day, and in addition by swabbing out the mouth and throat with Izal reduced to 1 in 40 = one teaspoonful to half a pint of water. Repeat twice a-day.

GREEN FEED.

Maize as Green Feed.—A good supply can be secured from a small plot of richly-manured ground. Give the ground a good dressing of super. manure, and later on a top dressing of nitrate of soda. Sow Hickory King, or any of the heavy flag-bearing sorts, and sow very thickly. This can be cut as soon as it is a foot high, and, if well watered, will give another crop. Sow plots for succession.

Sprouted Grain is an old substitute for green feed, and the principle was adopted, it is stated, by old-time Arctic explorers to obtain green vegetable growths. Sow the grain thickly in soil in a shallow box (such as a galvanized-iron case); cover with a little light horse manure, and water as needed. The case should stand in the shade: a straw thatch or shelter of boughs will do. When a few inches high soil and growth can be cut out in sections, and fed to the birds, or the growth only may be cut and fed to the birds. In many sprouting grains and seeds there is valuable food material—this is not contained to such an extent in the older growths.

Lucerne Hay Chaff.—On application to the Manager of the Government Irrigation Farm, Murray Bridge, poultry-breeders can obtain supplies of lucerne hay chaff for their poultry. It should be well soaked in water, to which a little salt may be added. Many inquiries reach me from parts of the State far distant from Murray Bridge. In such cases the cost of cartage would prohibit the economical use of lucerne chaff obtained there. In many localities lucerne grows well, and no doubt the poultry-breeders could secure some cut and cured into hay. As the chief food value is in the leaf, it may be pointed out that lucerne hay or hay chaff without the leaves is of little value. After cutting, the green lucerne should be heaped, and then, if possible, carted in and placed on a clean floor before chaffing. By some

such method very few of the leaves drop off, which will happen if the green-cut lucerne is exposed to great heat out in the open.

As a general rule the use of green feed is too restricted in this State among poultry-breeders. Very often recourse is had to old fibrous cabbage stumps, and lucerne which has flowered, and therefore of little value. Fowls are fond of sprouting grasses and the growing ends of most vegetation; these have both great value as foods and as stimulants in general metabolism.

TABLE POULTRY.

Local Demand.—For forward chickens and ducklings and for weighty old hens there is now a good demand in Adelaide. For prime young chickens the prices are most profitable. In sending to auction select and grade your stock carefully, and do not send too many at a time, or you may cause a glut. If you send to the Light Square branch of the Produce Department you can send as many as you like. All poultry received at the Government sales are killed and dressed. Pending sales they are held in cold store, a glut being thus avoided. When sending advise the manager by post card: give name and address of sender and number and kind of birds.

Size and Age.—Many people keep their chickens and ducklings too long. Ducklings, if well fed, should be ready for sale at nine to ten weeks from the shell, and are then very profitable. White-plumaged ducks sell the best, and are most profitable. Colored sorts, if large, will also bring satisfactory prices in the local markets. Chickens for the Adelaide market should weigh from 3lbs. upwards. At about four months old they should be at their best and most profitable age. Any sort or color will do for the local market, as long as they are young and fat. Buyers are now securing Christmas supplies, and sellers will do well to make early arrangements before buyers slacken off.

Fattening Ducklings.—House the ducklings in cool sheds, divided into small compartments to hold six or eight half-grown ducklings. Use plenty of straw or dry grass for bedding, and give plenty of clean drinking water. Keep a supply of grit and fine charcoal in a tin or dish. Feed on bran and pollard mixed to a crumbly (not sloppy) mass, and mix cut green food at least a third of the bulk. Feed three times a day. When topping off omit the green food, and add fat, at the rate of 1lb. for each 30 or 40 ducklings daily. Send to market before the pin feathers make their appearance. White ducklings should weigh 5lbs. to 6lbs. live weight at least.

Fattening Chickens.—Select the most forward and pen in small yards or coops. Provide ample fresh water, also gravel and charcoal grits. Feed on bran and pollard mixed with a little fat (1lb. among 50 birds daily) twice a day. Where available, the mash may be mixed with milk. The mash must not be sloppy. Market when they weigh from 3lbs.

Barley and oats, if well ground, make excellent fattening foods; but if

coarse, contain too much bulky and useless fibre. Meat meal and meat are not to be used in fattening poultry; these affect the flavor. If milk is given to poultry as drink, scrupulous attention must be paid to cleanliness. It is not advisable to alternate the use of sweet milk and sour milk. As a drink for ducklings it is not to be recommended, as sore eyes generally result. Be careful not to overcrowd the crates when forwarding to market. Chickens should have 15in. to 17in. head room. The floors of all coops should be close-boarded. Ducklings should be divided into lots of three or four; partition the coops.

Poultry for Export.—The season will commence with the new year, and the earlier ducklings are sent in the better prices they will realise. The export season for ducklings will end not later than the end of February, and for chickens about the end of March. Late shipments will not be made this season. The excellent prices realised for previous shipments should induce all breeders to co-operate in building up a large trade. The local markets are good only while good poultry is scarce. At the end of summer each year we see a glut in poultry. Do not keep your poultry too long. Fatten off and send to the Depot either for local sale or export. Further particulars may be obtained from the Poultry Expert, Department of Agriculture, Victoria Square East, Adelaide.

Old Hens.—There is a good market for old hens if fat and fairly heavy. The laying season is drawing to a close, and farmers should send in now—before the hens moult. Better prices can be realised now, and the cost of feeding unproductive birds will be saved. It is a great mistake to keep old stock until autumn, as at that time the markets are slack. In addition to local buyers there are several Victorian firms requiring poultry of all sorts.

Eggs.

With the exception of a few markets, at which the price of eggs was low, the season has been very satisfactory as regards prices. This is, no doubt, in part due to the demand for pickling and cold storage both here and in the other States. The rapid development of the egg-pulping business is also partly responsible, as it enables buyers to operate with less risk than in the ordinary way. The probable effect, in time, will be that for manufacturing purposes the eggs required will be held in pulp form. The market for eggs in the shell will resolve itself into two qualities—good and bad. The doubtful and bad eggs will find poor sale, while really good eggs will realise higher prices than they do at present. If pulping takes the place of cold storage in the shell, there will be less competition with the autumn and winter fresh eggs. The spring demand will be good, because manufacturers will buy their requirements up to a reasonable price limit without regard to speculation. London will very soon have some effect in fixing the price of eggs for pulping.

BRIGHT PROSPECTS.

At no time, in all the years I have been connected with the poultry industry have the prospects been so good as at present. The market for table poultry is first-class, and good profits can be made. The market for eggs is finding a satisfactory basis, which will be more stable as production increases. A tenfold increase in the production of both eggs and table poultry is needed, so that these products can be dealt with in greater bulk. Hundreds of tons of egg pulp can be shipped to England and elsewhere; for table poultry England offers a huge market. We want thousands to take up poultry-breeding, even if on a small scale, but on up-to-date lines. Information supplied on application to the Poultry Expert.

NOTES ON EGG-LAYING COMPETITIONS.

The outstanding feature in connection with the tests this month is the great increase in broodiness among the White Leghorns. No Leghorn hen which has shown the slightest sign of broodiness should be bred from. All pullets should be single tested before being used as breeders, and those which show any signs of broodiness should be rejected. At the present rate of progress it is only a matter of a few years before our Leghorns will be practically ruined. The falling off in egg production shows that the average laying powers of the flock are only medium. The mere fact of such a large increase in broodiness shows that many of our breeders are working in the dark. If such an important consideration is overlooked we may assume that other vital points are also neglected. Our breeders are receiving inquiries from various parts of the world, and the prospects of a satisfactory continuance of the export trade in laying stock will depend upon the maintenance of high egg production and absence of broodiness. The weather has been warm to hot; Kybybolite registered a shade temperature of 102° on 26th.

The Superintendents' reports are as follows:—

ROSEWORTHY.

The general health of the fowls has been good. Two deaths occurred during the month, both in section 1. Seventy birds in section 1 and 97 in section 2 have been handled for broodiness. The laying has started on the downward tendency, thus blighting any hopes entertained for a high general average. The leading pen still maintains its ability to put up fair average weekly scores, ranging in the vicinity of 33; but outside of this pen's work nothing of a sensational nature has occurred. The temperature for the period has been as follows:—Readings at 8-30 a.m., average max. 84.3, average min. 53.7; rain, 2 points; wind on 18 days.

KYBYBOLITE.

The general health has been good. One death occurred, due to abdominal dropsy. One bird was broody in section 1 last week for five days, but has now got under way again. Broodiness is very prevalent in section 2, and has gradually reduced the egg yield. The laying of Moritz Bros.' pen of White Leghorns has been most consistent. The light breed section has made a slight improvement on last month's figures. The weather during the major portion of November has been dry, hot, and sultry, accompanied with hot winds. The minimum temperature was 36°, and the mercury reached a maximum of 102° shade on Sunday, November 26th. Several people have visited the poultry station during the past month, amongst them members of the local Bureau, and they were well pleased with the healthy appearance of the birds after their long confinement.

D. F. LAURIE, Poultry Expert and Lecturer.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started on April 1st, 1911, and to terminate March 31st, 1912.]

Competitor.	Eggs Laid for Month ended November 30th.	Total Eggs Laid from April 1st, 1911, to Nov. 30th, 1911
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS (except where otherwise noted).

The Range Poultry and Egg Farm, Toowoomba, Queensland ..	124	797
Cosh, A. J., Normanville	115	816
Cowan Bros., Burwood, N.S.W.	112	804
Hamill, H., Kogarah Bay, Sydney	126	747
Rhodes, H. G., Brompton	118	672
Collings, C. A., Riverton	138	784
Hay, C., Normanville	100	840
Stevenson H., Port Melbourne, Victoria	126	634
Pope, F., jun., Rockleigh	105	565
Malthouse, James, Normanville	111	762
Moritz Bros., Kalangadoo	119	814
Whetstone & Knappstein, Clare	127	645
Lampe, Bert, Kadina, S.A.	113	653
Collings, C. A., Riverton	129	833
Bertelsmeier, C. B., Clare	120	822
Bond, A. J., Clare	123	636
Moritz Bros., Kalangadoo	119	715
Waite, F. J. Osborne, Nailsworth	108	660
Ellery, J., & Son, Clare	118	764
Kempster, T. E., Lilydale, Victoria	102	598
Kinnear, Mrs. A. E., Hyde Park	129	677
Steer, W. J., Port Pirie West	123	603
Fitz-Gerald, Gerald, Mordialloc, Victoria	123	701
Featherstone, Mrs. M. A., North Croydon	132	601
Lawson, Miss N., Lower Mitcham	135	691
Provis, Mrs. W., Eudunda	131	694
Steed, J. F. T., Woodville	121	753
Uran, Mrs. P. A., Kapunda	142	812
Oodling H., Mitcham Park	127	676
Provis, W., Eudunda	121	704
Pedder, E. A., Burnside	125	717
Tockington Park Poultry Farm, Grange	121	724
Swann, V. Roy, Jamestown	105	491
Miela, C. & H., Littlehampton	118	607
Wondatta Poultry Farm, Eudunda	105	427
Purvis, Master James, West Glanville	121	732
South Yan Yean Poultry Farm, South Yan Yean, Victoria	100	619
Sargenfri Poultry Yards, East Payneham	91	704
Mazey, Phillip, Alberton	124	706
Padman, A. H., Hyde Park	132	793
Hill Chas., Monarto South	114	610

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended November 30th.	Total Eggs Laid from April 1st, 1911, to Nov. 30th, 1911.
SECTION I.—LIGHT BREEDS—Continued.		
WHITE LEGHORNS (except where otherwise noted).		
Read, J. D., Springhurst, Victoria	119	641
Mildren, D., Clare	126	725
Eckermann, W. P., Budunda	129	774
Hurford, E. W., Grangeville	115	794
Sargenfri Poultry Yards, East Payneham	121	696
Shepherd, R. H., Balaklava	127	700
Rice, J. E., Cottonville	128	703
Burden, H. P., Balaklava	134	725
South Yan Yean Poultry Farm, South Yan Yean, Victoria....	144	728
Keddie, R. A., Woodside	133	711
Purvis, Miss Gracie, West Glenville	115	788
March, H. S., Kapunda	91	699
Mildren, D., Clare	122	689
Hill, Chas., Monarto South	76	680
Marshall, J. W., Moonta	127	734
Hollands, Iru, Moonta	129	724
Dyer, P., Woodville	124	730
Edgar, R., Moonta	121	765
Hoeking, E. D., Kadina	111	552
Purvis, W., West Glenville	118	831
Quading, R., Kangaroo Flat	130	730
Howlett, B., Moonta	117	658
Addison, Mrs. A. L., Malvern	113	618
Menkens, F. H., Hanley Beach	120	768
Haines, T. F., Fullarton Estate	123	670
James, Wm., Oroydon	128	584
Petrigrove, T. A., Northcote, Victoria	123	678
Read, J. D., Springhurst, Victoria	113	532
RJordan, D., East Town	116	608
Kappler Bros., Marion	19	670
Bertelsmaier, C. B., Clare	135	737
"Keoncoewarra," Enfield	116	666
Marrison & Smith, Prospect	136	679
Connor, D. C., Gawler	110	724
Thistle Stud Poultry Farm, Quorn	136	646
Uren, P. A., Kapunda	136	659
March, H. S., Kapunda	127	751
Navan Poultry Farm, Minlaton	114	539
Holmes, F. A., Frances	119	658
Lillywhite, R. G., Dulwich	96	727
Burden, Mrs. M., Islington	93	640
Oombes, E. R., Silverton, N.S.W.	120	758
Curtis, G. R., Mitcham	19	651
Roche, Mrs. N., Middle Brighton, Victoria	115	635
Mitcheeson, B. H., Prospect	98	753
Hannaford, F. E., Monteith	107	658
Belcher, P. A. S., Georgetown	110	577
Whitrow, A. J., Knoxville	122	688
"Burinima," Kybybolite	112	542
Kalma, A. G., Budunda	112	626
Counter, E., & Foreman, Hindmarsh	104	550
Morton, T. W., East Moonta	85	519
Hall, T. C., Rose Park	108	588

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended November 30th.	Total Eggs Laid from April 1st, 1911, to Nov. 30th, 1911.
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SECTION I.—LIGHT BREEDS—*Continued.*

WHITE LEGHORNS (except where otherwise noted).

Ontario Poultry Farm, Clarendon	131	609
Biggs, W. D., Hyde Park	118	682
Tomlinson, W., Clarence Park	112	579
Redfern Poultry Farm, Caulfield, Victoria	162	964
Sickert, P., Clarence Park	117	563
Bennett, W. C., Magill	135	746
Franklin, G., Kent Town (Minorcas)	114	680

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTON.

Brundett, S., Moonee Ponds, Victoria	117	685
Phillips, A., Portland, S.A.	92	628
Cowan Bros., Burwood, N.S.W.	94	681
Hutton, C., Parkside	108	511
Bertelsmeier, C. B., Clare	92	486
Tookington Park Poultry Farm, Grange	92	616
Padman, J. E., Plympton	88	660
Killara Poultry Farm, Tyatt, Victoria	103	580
Martin, B. P., Unley Park	109	761
Francis Bros., Fullarton	100	677
Bertelsmeier, C. J., Clare	80	580
Padman, J. E., Plympton	77	681
Killara Poultry Farm, Tyatt, Victoria	110	703
McKenzie, E., Northcote, Victoria	97	780
Craig Bros., Hackney	113	884

BUFF ORPINGTON.

Ross, J. W., Somerton, via Glenslg.	74	529
Hocart, F. W., Clarence Park	86	554

WHITE ORPINGTON.

Spies & Harvey, Hamley Bridge	86	532
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SILVER WYANDOTTES.

Cant, E. V., Richmond	81	719
Kappler Bros., Marion	98	625
Burden, H. P., Balaklava	94	574
Redfern Poultry Farm, Caulfield, Victoria	98	608

LANGSHAMS.

Stevens, E. F., Littlehampton	94	634
Jones, H. D., Broken Hill	83	510
Thomson, Geo., Germaniam	91	675

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended November 30th.	Total Eggs Laid from April 1st, 1911, to Nov. 30th, 1911.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS (except where otherwise stated).

Moritz Bros., Kalangadoo	151	966
Sudholz, Alf., Kalangadoo	107	670
Boyce, J., Kalangadoo	118	688
"Muhama," Mount Gambier	139	852
"Herdfield," Mount Gambier	124	781
Lewis, C., Bordertown	118	622
Staunton, S., Naracoorte	126	533
Lillywhite, R. G., Dulwich	99	727
Jarrad, J., Mount Gambier	130	785
Hall, C. W., Mount Gambier	124	769
Sargenfri Poultry Yards, East Payneham	146	750
Vorwerk, H. F. & A. C., Millicent	121	818
Lacey, F. C., Kybybolite	118	744
Kinnear, Mrs. A. E., Hyde Park	122	717
Rake, A., Kalangadoo	119	695
"Kurinima," Kybybolite	92	600
Smith, B. L., Hynam	105	569
Day, Mrs., Roseworthy	105	599
Scholz, C. H., Kybybolite	119	703
Purvis, W., West Glamville	128	747
Hannaford, Mrs. F. E., Montejith	117	734
Jenkins, Mrs. C. J. A., Kybybolite	115	688
Bertelsmeier, C. B., Clare	132	714
Navan Poultry Farm, Minlaton	109	576
Scholz, A. B., Kybybolite	107	635
Mohr, S., Tanianoola	122	727
Featherstone, Mrs. M. A., North Croydon	116	574
Toseland, G., Geranium	91	624
"Koonoowarra," Enfield	121	587
Palmer, W., Franklin Street, Adelaide	116	577
Oosh, A. J., Normanville	91	679
Queate, W., Lameroo	107	682
Tomlinson, W., Clarence Park	110	535
Reed, A. J., Pinnaroo	124	590

SECTION II.—HEAVY BREEDS.

SILVER WYANDOTTES.

McNamara, Mrs. D., Mount Gambier	70	593
Moritz Bros., Kalangadoo	46	479
Staunton, S., Naracoorte	36	490
Burden, H. P., Belaklava	59	573
Vorwerk, H. F. & A. C., Millicent	59	572
Virgo, A. W., Bordertown	46	400

BLACK ORPINGTON.

Smith, W., Hynam	59	380
Phillips, A., Portland, S.A.	38	478
McNamara, Mrs. D., Mount Gambier	69	489
Bertelsmeier, C. B., Clare	66	441
Blue Lake Poultry Yards, Mount Gambier	67	621
Ball, H., Kaniva, Victoria	104	528

LANGSHANS.

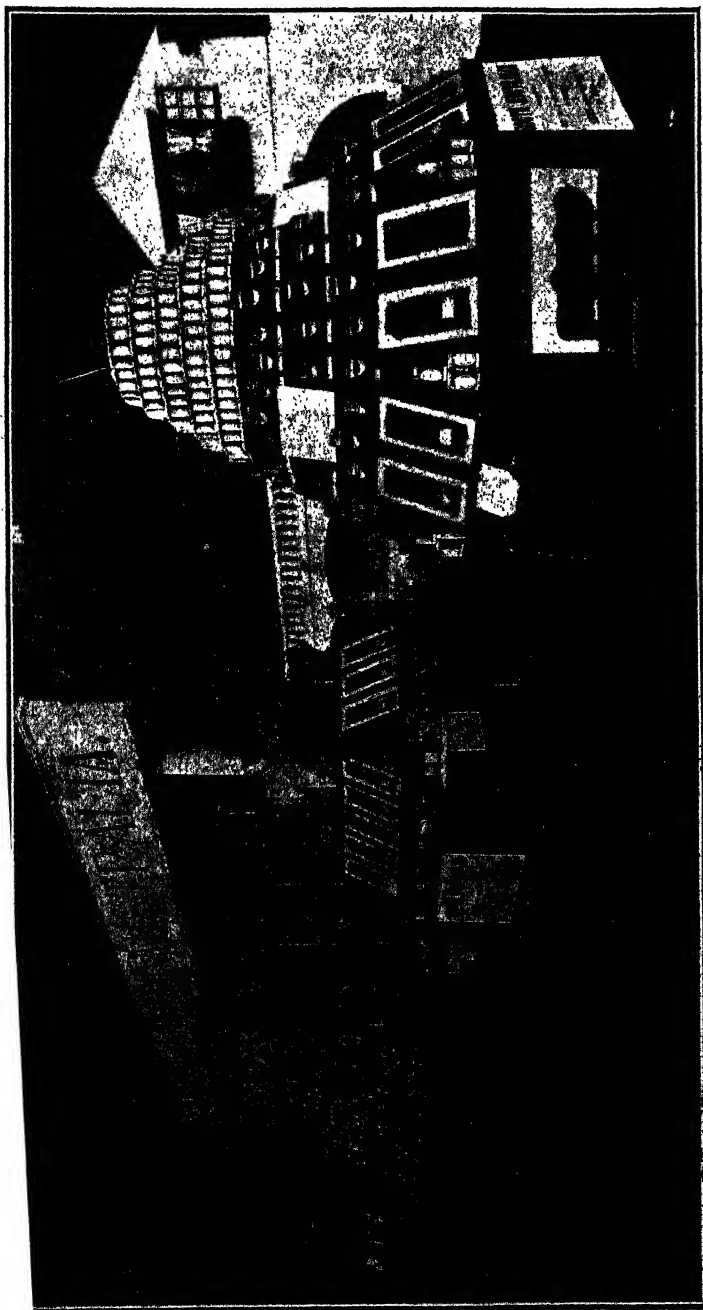
Toseland, Geo., Geranium	82	602
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SOUTH AUSTRALIAN PRODUCE.

EXHIBITS AT SHOWS IN UNITED KINGDOM.

During September and October representative exhibits of South Australian produce were made at a number of shows held in various cities in the United Kingdom. In his reports dealing with these shows, the Acting Trades Commissioner states that in every case the South Australian exhibits attracted great attention, and instigated many inquiries as to the resources of the State. Referring to the Grocers and Allied Trades Exhibition, which was held in London from September 16th to 23rd inclusive, Mr. Whitcomb says—

"Our exhibit included fresh, dried, and bottled fruits, mutton, mutton and tongues, wheat, wine, oil, and honey. The fresh, dried, and bottled fruits sent by the Produce Department were excellent, and they, with the other products, made up a display which did credit to South Australia. The trade press commented very favorably upon our exhibit. Very numerous inquiries were received from traders as to how supplies of the various products (especially dried fruit) shown could be obtained, and there is no doubt that there is a large market in this country for these products. . . . When, however, to all our inquirers I have had to reply vaguely and in generally ambiguous terms on the subject of supplies, it has seemed to me that these shows of produce are to some extent futile; for while we have for some years in this way advertised South Australian produce, and have created such keen interest that there is a ready market for all dried and bottled fruits, wines, etc., the producers have, so far as I am aware, made no efforts to take full advantage of the markets opened up. The samples of products sent and displayed are so good (and this applies especially to dried fruit), and they naturally provoke inquiries for supplies, and it is disheartening and unflattering to the State to have to reply that there are none obtainable. The value of these displays of South Australian products as the means of opening up markets would be greatly increased and would be made really effective if producers would make consignments of produce to the Department, to be placed with prominent and reliable firms, or in some way back up the Department's efforts by making it possible to direct inquirers where goods could be obtained in Great Britain. Under existing conditions we are with each show re-creating an interest in our produce, which is awakened only to drop because it cannot be fostered, and which eventually seems likely to die of exhaustion for want of supplies to satisfy it."



South Australian Exhibit at Grocers' Exhibition.

GOVERNMENT INSPECTION OF STALLIONS.

LIST OF CERTIFICATED HORSES.

The list of certificated stallions from September 14th, 1909, up to October 31st, 1911, is as follows:—

Name of Horse.	Age.	Owner.	Address.	Date.
DRAUGHTS.				
Acorn	Aged	J. Lehmann	Pinnaroo	27/10/11
Albyn's Model	4 years	F. and F. Edmunds....	Petersburg ...	18/7/11
*Alexander's Own	3 "	Lang Bros.	Caltowie	20/7/11
Ambassador II.	2 "	J. Williams	Meningie	6/4/11
Approbation	2 "	Hogarth and Warren ..	Anna Creek ..	17/7/11
Attractive	2 "	G. K. Jenkins	Terowie	17/7/11
Balloch Major	3 "	H. and C. Hancock ...	Quorn	7/9/11
†Bancor Jun.	3 "	W. Wright	Inglewood....	19/7/11
Banker	5 "	J. A. Sudholz	Kalangadoo ..	1/9/11
*Baron Grant	3 "	McDougall & Sons	Morchard	20/7/11
Baron Idadale	4 "	F. W. Doering	Dutton	8/8/11
Bayonet	3 "	E. Wright	Meningie	26/10/11
Belfast	5 "	A. G. David	Kadina	4/8/11
*Bellringer	4 "	J. H. Klemm	Appila	17/7/11
Yarrowie				
*Belted Knight	Aged	A. Blum	Lammerbo	28/10/11
Ben Bolt	Rising 3	E. W. Watson	Murat Bay ..	24/5/11
*Benall II.	5 years	A. Kirk	Clement's Gap ..	20/7/11
*Ben Lomond	7 "	H. W. Steinwedel	Balaklava	24/9/09
Black Albyn	2 "	J. Saunders	Tarlee	17/7/11
Black Boy	3 "	W. B. Pfitzner	Robertstown ..	17/7/11
Black Douglas	2 "	J. Haydon	Hoyleton	17/7/11
*Black Knight	7 "	I. Robertson	Mannanarie ..	22/7/11
Black Prince	3 "	N. B. Travers	Belalie North ..	19/7/11
Blondin	7 "	H. W. Sambell	Yongala	2/10/11
Bonnie Blue	4 "	E. R. Hoffrichter	Denial Bay ..	26/5/11
Bonnie Charters	2 "	J. Haydon	Hoyleton	17/7/11
Bonnie Chief	3 "	O. Glastonbury	Clare	17/10/11
Bonnie Dundee	2 "	A. Fuller	Pt. Germein ..	17/7/11
Bonnie Dundonald	2 "	H. Body	Fremantle, W.A.	18/7/11
Bonnie Lad	4 "	A. H. Nettle	Willaston	17/7/11
*Bonnie Lad	Aged	J. A. Jaensch	Murray Bridge ..	23/3/10
Bonnie Laddie	2 years	Jas. Bodey	Mt. Gambier ..	17/7/11
Bonnie Laddie	4 "	M. Coleman	Anama	18/8/11
Bonnie Scot	2 "	Grig Hicks	Miram, Victoria ..	17/7/11
Boro Primate	3 "	W. F. Walkley	Adelaide	27/5/11
Botany	4 "	E. G. Polgreen	Cowell	23/8/11
Botany Bay	2 "	A. Greenslade	Maitland	18/10/11
Botanist II.	3 "	A. McCauley	Maitland	18/10/11
*Bramhope Monarch ..	6 "	G. Weatherall	Hahndorf	10/3/10
Bright Star	2 "	Dawkins Bros.	Angle Vale ..	18/7/11
*British Prince	3 "	S. D. Stedman	Bordertown ..	18/7/11
Britton	5 "	Sanders Bros.	Hoyleton	2/8/11

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
<i>DRAUGHTS—continued.</i>				
Lord Tass	6 years	Scarfe Bros.	Roseworthy ..	16/8/11
*Lunésdale Burton ..	5 "	J. N. Dixon	Narridy	1/9/11
Mainstay	3 "	A. Wells	West Australia	17/7/11
Major	4 "	E. F. H. Kakoschke ..	Lameroo	4/7/11
Major	5 "	Wheeler Bros.	Elbow Hill ..	23/8/11
*Major General	8 "	J. G. Nitschke	Mt. Gambier ..	1/9/11
*Major Grant	6 "	G. P. Hillyer	Mt. Gambier ..	2/9/11
Major Hamilton	3 "	E. G. & H. J. Daniel ..	Kulpara	19/7/11
Major Mac	2 "	A. Wood	Avon, Balak-lava	18/7/11
Major Myrning	2 "	Geo. Adams	Brinkworth ..	18/7/11
*Major Taylor	8 "	A. H. Todd	Cleve	6/6/11
Maori Chief II.	7 "	J. O. O'Neil	Snowtown	15/5/10
Maori King	6 "	Geo. Perry	Milang	25/10/10
Mark	Aged	G. A. Griffiths	Butler	27/7/11
Mark Charters	2 years	H. A. Wohlers	Hynam	23/8/11
Marquis	5 "	W. B. Rankine	Strathalbyn ..	21/10/10
Masher King	3 "	C. Underwood	Beaufort	5/8/11
Matchless	Aged	T. H. Tank	Reynella	18/7/11
McKenzie Tartan	2 years	F. Burns	Snowtown	17/7/11
Merry Mac	3 "	F. H. Edwards	Pinnaroo	3/7/11
*Merrymaker	3 "	Sydney Greenslade	Maitland	18/7/11
Merry Oak	5 "	H. Wood	Woods	24/9/09
Model King	3 "	P. Flannagan	Salisbury	18/7/11
Moeraki	5 "	McArthur Bros.	Millicent	27/10/09
Mountain Hero	2 "	James & Sons	Charlton	17/7/11
Musterer	5 "	E. G. Bristow	Willowie	8/9/11
Navy Blue	6 "	W. Lightbody	Maitland	19/7/10
*Nelson Lyon II.	3 "	J. W. Towers	Millicent	4/9/11
*Nobleman	3 "	W. Fuller	Yacka	18/7/11
Nobleman	2 "	R. James	Riverton	18/7/11
Nomby	8 "	W. Hawker	Anama	18/10/10
Oak Chip	4 "	P. Marshall	Bordertown ..	19/8/11
Oaklad	5 "	R. A. Hancock	Moonta	21/9/11
Oakland II.	5 "	C. R. Thiele	Sunnyside	22/3/11
Paymaster	5 "	F. W. C. Schultze	Quorn	7/9/11
*Pearlstone	8 "	J. F. Klemm	Gladstone	17/7/11
Percival	4 "	R. Ellery	Orroroo	3/10/11
Perfection	2 "	Jas. Bodey	Mt. Gambier ..	17/7/11
Pride of Bakara	5 "	C. A. Rowe	Swan Reach ..	14/7/10
Pride of Barossa	6 "	F. Manzel	Gawler	22/9/09
Pride of Loxton	3 "	M. Siebert & Sons	Loxton	16/9/11
Pride of the Marsh	2 "	T. Colebatch	Strathalbyn ..	19/7/11
Pride of the Mount	3 "	J. Lean	Mt. Gambier ..	17/7/11
Pride of Oak	5 "	H. G. Stening	Cowell	28/9/10
Pride of Nangula	2 "	J. C. A. Nitschke	Millicent	17/7/11
Prince	Aged	W. Smith	Hynam	26/8/10
Prince	2 years	J. McInerney	Tarlee	28/9/11
Prince Albert	4 "	A. J. Inkster	Elliston	22/5/11
Prince Albyn	4 "	J. F. Dodd	Milang	19/7/11
Prince Charlie	7 "	A. Tainsh	Murat Bay	24/5/11
Prince Charlie	8 "	Hudson Bros.	Lipson	103/10/11
Prince Malcolm	5 "	W. Tiller	Balaklava	2/8/11
Prince Roy	6 "	A. Scott	Colton	24/8/09
Prince Royal	5 "	Trustees late J. Grundy ..	Second Valley ..	24/10/11
Prince of Wales	2 "	G. P. Hillyer	Mt. Gambier ..	17/7/11
*Quality	3 "	F. J. H. Cleggett	Langhorne's Ck.	18/7/11

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
DRAUGHTS—<i>continued.</i>				
Ralli	7 years	J. N. Smith	Fords	5/9/11
Ranfurly	8 "	A. Rowan	Talia	17/8/10
Ranfurly	4 "	A. E. Cockran	West Australia	17/7/11
Red Lion	4 "	J. & M. Sullivan	Halbury	2/8/11
Rendelsham Major Grey	5 "	N. Brookman	Adelaide	14/9/09
Riverina	3 "	N. W. Gunn	Chickierloo	18/7/11
Rob Roy	2 "	T. H. McKay	Kadina	17/7/11
Robin Grant	2 "	Butler & Sons, Ltd.	Adelaide	18/7/11
Royal	3 "	G. J. Stephens	Wilmington	8/9/11
Royal Arthur	8 "	Ellery Bros.	Orroroo	7/9/10
Royal Blue	4 "	Dennis Ryme	Pekina	30/5/11
*Royal Blend	5 "	J. & J. Francis	Maitland	20/7/10
Royal Blue	8 "	V. Lally	Lwr. Wakefield	18/7/11
Royal Darnley	3 "	L. Short	Blyth	18/7/11
Royal David	5 "	F. Handtke	Murat Bay	19/7/11
Royal George	2 "	W. Redden	Gumeracha	3/4/11
Royal George	2 "	J. & M. Sullivan	Halbury	2/8/11
Royal Hero	2 "	T. Reed	Pinnaroo	17/7/11
Royal Leaf	4 "	J. Feuerherdt	Brownlow	8/8/11
Royal Lion	5 "	Kerin Bros.	Jamestown	4/8/11
Royal Oak	5 "	Bowden Bros.	Moonta	22/9/10
Royal Oak	2 "	B. Mumford	Port Victoria	18/9/11
Royal Salute	2 "	T. Philpy	Kadina	19/7/11
Royal Sandy	5 "	J. M. & E. F. O'Sullivan ..	Tarlee	28/9/11
Samson	5 "	R. Petherick	Green's Plns. W.	4/8/11
Sailor	8 "	D. Skene	Penola	1/9/11
Scottish Chief	5 "	G. H. Hart	Edinburgh	3/8/10
Shamrock Boy	Aged	W. T. Lewis	Elliston	22/5/11
Shepherd Boy	2 years	T. H. McKay	Kadina	17/7/11
Shepherd Boy	2 "	G. E. Patingale	Pt. Broughton	20/7/11
Shire Chief	3 "	Jas. Sampson	Beaufort	2/8/11
Sir Frederick	3 "	W. J. Polgreen	Moonta	21/9/11
Sir Glancer	5 "	W. H. Day	Caurnamont	14/6/11
Sir Hector McDonald	8 "	E. G. Miller	Springton	14/9/09
Sir John	4 "	A. J. Thompson	Paninya, Vic.	3/7/11
Sir Major	2 "	W. R. Michael	Snowtown	18/7/11
*Sir Robert	5 "	W. H. Sires	Balaklava	3/8/10
Sir Wallace	5 "	H. R. Haywood	Two Wells	6/10/10
Sir Walter	5 "	D. Dabinett	Lameroo	20/7/10
Sir Walter Scott	3 "	Fennessey & Son	Clinton Centre	18/7/11
Sir William	2 "	A. B. McLean	Gawler	17/7/11
*Sir William	6 "	E. J. Kennedy	Naracoorte	26/8/10
Southern Star	6 "	Lloyd Short	Blyth	14/9/09
*St. Ambrose	3 "	Carter Bros.	Penola	1/9/11
Standley	4 "	C. Gunn	Mt. Cooper	29/5/11
Supreme	2 "	Hogarth & Warren	Anna Creek	17/7/11
Surprise	3 "	J. T. Martin	Mt. Benson	21/9/11
Tatiara Chief	4 "	Langley Bros.	Wolseley	19/8/11
*The Baron	3 "	Crossing Bros.	Broken Hill	18/7/11
*The Bruce	3 "	E. E. Lang	Booloroo Centre	18/7/11
The Count	3 "	C. H. Dunn	Woodchester	20/7/11
The Crown	8 "	T. Freeman & Son	Bagster	25/5/11
The Czar	2 "	J. G. Moseley	Port Augusta	20/7/11
The Duke	2 "	Jacka Bros.	Melrose	8/9/11
The Laird	2 "	T. Carling	Bruce	17/7/11
The Masher	Aged	K. Cameron	Warracknabeal	20/10/08
The New King	3 years	G. Cleggett	Langhorn's Ck.	28/9/11

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
DRAUGHTS—<i>continued.</i>				
Timaru	4 years	C. H. Boundy	Warooka	2/8/11
Tinker	4 "	M. A. Kenny	Witera.	29/5/11
Togo	4 "	W. Gardiner	Ninnes.	16/8/11
Tommy Atkins	2 "	H. Klemm	Appila-Y'rowie ..	18/7/11
Tommy Burns	2 "	Hogarth & Warren ..	Anna Creek ..	18/7/11
Tommy Burns	3 "	W. Spehr	Millicent	4/9/11
True Blue	11 "	W. Rodda	Green's Plains ..	29/9/09
*Tweedside Again ..	5 "	C. J. White	Mt. Gambier ..	3/9/10
Uniform	2 "	E. G. Parker	York	17/7/11
Vanquisher	5 "	John Foster	Robe	22/9/10
V.I.C.	5 "	W. & C. Brook	Woodchester ..	28/9/11
Victor	Aged	McCabe Bros.	Mt. Gambier ..	10/9/10
Wallace	4 years	Hill Bros.	Georgetown ..	30/5/11
Wandering Willie ..	4 "	J. A. Thiele	Murray Bridge ..	22/3/11
Warrego	3 "	F. J. H. Cleggett ..	Langhorne's Ck. ..	15/7/11
Warrimoo	4 "	H. C. Hodgson	Finniss	8/9/11
*Whitechurch Swell ..	2 "	Fitzgerald Bros.	Auburn	15/3/11
William Tell	9 "	E. R. Pengilly	Murat Bay ..	24/5/11
Willowby	5 "	P. J. Harvey	Yacka	5/8/10
Wimmera Chief	5 "	C. H. Dunn	Woodchester ..	14/9/09
Wimmera Prince	3 "	A. C. & G. C. Maidment	Loxton	16/9/11
†Young Agitator	5 "	Fitzgerald Bros	Auburn	9/8/10
*Young Ben	6 "	W. Westphall	Kadina	19/7/11
Young Darnley	8 "	J. & J. Francis	Maitland	19/7/10
Young Farmer	8 "	R. Harrowfield	Butler	13/10/10
Young Firrall	3 "	J. Clezy, jun.	Naracoorte ..	23/8/11
Young Flashwood	5 "	Fisher Bros.	Bordertown ..	20/8/10
Young Glasgow	6 "	J. Forrest	S. Hummocks ..	5/8/11
*Young Gramplan	7 "	C. Forbes	North Shields ..	13/10/10
*Young Heart of Oak ..	Aged	A. Rodda	Green's Plns.W. ..	5/8/11
*Young Hero's Pride ..	6 years	D. J. Hanrahan	Arthurlton ..	18/10/10
Young Jewel	2 "	R. Ward	Nhill	18/7/11
Young King Edward ..	4 "	F. Barnes	Streaky Bay ..	22/5/11
Young Kinloch	2 "	A. Greenslade	Maitland	19/7/11
Young Landon	2 "	T. H. McKay	Kadina	17/7/11
Young Majestic	5 "	T. Prior	Julia	8/8/11
Young Maori	5 "	Reschke Bros.	Coonawarra ..	1/9/11
Young McKie	7 "	Thos. Mudge	Streaky Bay ..	19/7/11
Young Model Hero	7 "	J. C. E. Rudiger	Robertstown ..	29/9/09
Young Moeraki	2 "	McArthur Bros.	Millicent	4/9/11
Young Montrave	7 "	J. & M. Sullivan	Halbury	3/8/10
Young Montrose	5 "	J. A. Ratten	Balaklava	3/8/10
Young Mountain Hero ..	5 "	E. & W. Branson	Tarlee	30/9/10
Young Percival	5 "	Langley Bros.	Wolsley	19/8/11
Young Pride of Oak	6 "	J. Nankivell	Minlaton	10/8/10
Young Prince of Wales	3 "	W. E. Long	Buhlacowie	2/8/11
Young Robin	Aged	Jones Bros.	Pinnaroo	27/10/10
Young Shepherd King ..	4 years	M. C. Kennedy	Millicent	4/9/11
Young Sir Ben	7 "	Tonkin & Croser	Minlaton	19/10/10
Young Sir David	3 "	J. & H. Hurst	Truro	5/9/11
*Young Tasman	7 "	John Holloway	Glencoe West ..	2/9/11
THOROUGHBREDS.				
Admiral Nelson	4 years	A. J. Berriman	Saddleworth ..	8/8/11
Adrian	5 "	M. P. McDonald	Naracoorte ..	23/9/11
Artillery	4 "	W. T. Foster	Quorn	14/2/11
Ben Hur	Aged	Penny Bros.	Saddleworth ..	8/10/09

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
THOROUGHBREDS—<i>continued.</i>				
Binnia	Aged	J. F. Kirby	Mingbool.....	2/9/10
Blackfish.....	7 years	Duncan Campbell	Penola	12/10/09
Blackthorn	Aged	Hon. J. Lewis	Burra	19/8/10
Bright Light	7 years	J. & H. Hurst	Truro	20/7/10
Bright Testig	7 "	E. A. Smith	Port Pirie	1/9/10
Capitano	6 "	W. R. Michael	Barunga Gap	17/8/10
Carlinga	7 "	J. T. Whyte	Cleve	28/9/10
Carlyoffe	Aged	J. H. Gaylard	Lameroo	28/10/10
Carlyon II.	2 years	Major Miles	Crystal Brook	1/9/10
Celtic	Aged	R. F. Murphy	Lameroo	28/10/10
Chainman		T. Mudge	Streaky Bay	22/5/10
Devlin	7 years	W. Burns	Gawler	24/8/10
Duke of Richmond	Aged	W. A. Blackler	Adelaide	3/3/10
	7 years			
Dynamite	Aged	R. M. Hawker	Bungaree	19/10/10
Emuam-na-Knuock	"	A. C. Coote	Port Elliot	27/10/09
Fawn Malion	5 years	H. A. Spurling	Lochiel	15/10/10
Felix	7 "	W. Templer	Adelaide	13/9/10
Fulgurate	5 "	W. Potter	Wolsley	19/8/10
*Gambler Dick	5 "	J. & H. Hurst	Truro	7/8/10
Gang-Forward	8 "	W. J. Towers	Millicent	5/9/10
Ganymedes	8 "	W. A. Blackler	Adelaide	3/3/10
Glen Eager	8 "	P. H. McEagan	Mt. Gambier	3/9/10
Good Morning Bill	Aged	A. Nichol	Adelaide	23/9/09
Gun Sound	6 years	F. W. C. Hawke	Kadina	21/9/10
Insinuation	3 "	J. W. Towers	Millicent	4/9/10
Isonomey	5 "	J. & M. Sullivan	Halbury	3/8/10
Juggler	11 "	W. R. Michael	Snowtown	22/9/09
Juggler King	5 "	John Ireland	Hawker	6/10/10
*Juniper	Aged	Langley Bros.	Bordertown	20/10/10
Kallioota	4 years	Yalkuna Station	Tumby Bay	28/7/10
King Edward	Aged	D. James	Kapunda	9/2/10
King Thor	6 years	A. M. Turner	Cradock	6/10/10
Kooringa	7 "	Hon. J. Lewis	Burra	5/10/10
Lord Agnopyn	7 "	Beattie Bros.	Cowell	28/9/10
Macquarie	Aged	R. Ellery	Orroroo	6/10/09
Massaniello	"	F. Fawcett	Port Pirie	6/8/10
Merriang	"	D. W. Johnsson	Port Pirie	1/9/11
Merryman	8 years	F. Handtke	Goode	27/5/11
Merry Monarch	8 "	C. Schmidt	Quorn	28/7/10
Norback	6 "	A. Johnston	Angaston	29/9/09
Orbellette	3 "	R. K. Kitto, jun.	Moonta	21/9/11
Pandion	4 "	G. Harris	Cowell	23/8/11
Parsifal	6 "	G. G. Bailey	Everard Centre	15/8/11
Pistol	Aged	J. H. Aldridge	Richmond Park	23/2/11
Pocillator	6 years	Hon. J. J. Duncan	Adelaide	16/8/11
Prediction	4 "	Jas. McDonald	Roseworthy	16/8/11
Pretender	Aged	E. Miles	Bordertown	19/8/11
Pygmalion	"	J. Hill	Clare	18/10/10
Prior Junior	7 years	J. F. Miller	Springton	13/8/10
Raven	Aged	J. O'Loughlin	Hawker	6/8/10
Resemblance	6 years	A. Standley	Balaklava	3/8/10
Resemblance	7 "	W. Wilkins	Kadina	4/8/11
Reynella	5 "	W. S. Day	Milang	22/10/09
Rheostat	8 "	J. Mulqueeny	Mt. Gambier	13/10/09
Sabre	7 "	McCabe Bros.	Pinnaroo	27/10/10
Santoi	7 "	R. W. Herbert	Barunga Gap	17/8/10

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
THOROUGHBREDS—<i>continued.</i>				
Scattaco	7 years	T. Mudge	Streaky Bay .	22/5/11
Scuttle Cask	4 "	F. C. Wheeler	Mt. Gambier .	2/9/11
Scrutiny	7 "	T. Arthur	Orroroo	6/10/09
Sir Gulver	5 "	H. H. Ratcliffe	Lameroo	28/10/10
Sir Mallon	7 "	O. G. Bartholomaeus	Arkaba	5/9/11
Sojourner	Aged	J. Mullins & Sons	Nairne	22/10/09
Solitary	"	A. & G. McFarlane	E. Wellington	3/3/10
Soofeeism	6 years	B. Crittenden	Blyth	19/10/10
Starlight	5 "	O'Leary Bros.	Hawker	6/10/10
Step Out	Aged	Geo. Bennett	Edwardstown.	2/3/11
*Straightshot	"	A. Boutell	Jamestown ..	5/8/10
Straightline	5 years	Jas. Quinlan	Yallunda Flat.	27/7/11
St. Vincent	Aged	H. Mentha	Adelaide	22/10/09
Swirl	"	R. Smith	Pinnaroo	27/10/10
Tatiara	"	T. Duell	Burra	22/7/11
The Greek	5 years	A. P. Bowman	Campbell House	26/10/10
The Admiralty	Aged	E. A. Wickens	Gawler	22/9/09
The Castaway	6 years	T. Kinnear	Moonta	29/9/09
The Nut	Aged	D. Shanwall	Wilmington ..	20/9/10
The Pilot	"	J. N. Davies	Kingscote	11/5/11
The Tinman	5 years	W. Robertson	Gunyah	8/9/11
Thunder King	Aged	T. R. Tapley	Thistle Island.	20/9/10
Toff	7 years	A. C. Hewton	Yorketown ..	3/8/10
Torah	8 "	W. R. Warren	Port Pirie ..	7/9/10
*Trentbridge	Aged	E. Copping & Sons ..	Lucindale	12/10/09
Vagabundus	2 years	G. Hill	Kadina	4/8/11
Valiant	Aged	H. Carter	Crystal Brook.	3/8/11
Vincent	4 years	J. McKenzie	Dimboola East	17/7/11
*Whalebone	Aged	W. R. Cross	Mt. Gambier ..	10/9/10
Willy Willy	5 years	J. Q. Cox	Bordertown ..	20/7/11
Young Damper	8 "	O. J. Beckman	Snowtown	21/9/09
Young Gulliver	3 "	A. Thomson	Weepa Park ..	22/5/11
Young Pishoage	6 "	J. H. Wilson	Two Wells	6/10/10

LIGHTS.

Angler	Aged	H. Lovett	Willunga	21/10/10
Appremont	6 years	R. W. Rowett	Eudunda	29/9/09
Baron's Policy	6 "	J. G. Schulz	Swan Reach ..	14/6/11
Baron Rothschild	9 "	R. Smith	Adelaide	14/9/09
Blackboy	7 "	E. Thiele	Loxton	16/9/11
Blue Grass	7 "	W. Potter	Wolsley	19/8/11
Bosco	5 "	J. & A. Myerhoff ..	Enfield	1/9/11
Calastine II.	Aged	W. R. France	Lipson	27/7/11
Cashier	7 years	R. Crittenden	Adelaide	14/9/09
Clarke's Hero	5 "	F. H. Collins	Urania	19/10/10
Comet	Aged	Geo. Barrett	Kingscote	11/4/11
Countryman	8 years	W. C. Hill	Petersburg	4/10/10
Cronje	Aged	Klinger Bros.	Halbury	3/8/10
Darkfish	5 years	F. J. Bateman	Tantanoola ..	24/9/10
Derby	5 "	H. Panell	Kadina	4/8/11
*Experience	Aged	Jacob Rosenberg	Adelaide	17/9/10
Foreigner	"	G. Wyatt	Two Wells	7/10/09
Fortune Teller's Pride	3 years	T. Martin	Parkside	12/9/11
Frank Harold	7 "	Meyerhoff Bros.	Maitland	14/9/09
Gay Lad	3 "	F. T. Weeks	Loxton	16/9/11
General	6 "	J. Dodd	Hindmarsh Is.	22/10/09
Gaylock	9 "	J. R. Marston	Yorketown ..	3/8/10

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
<i>LIGHTS—continued.</i>				
Golden Eagle	5 years	A. E. Beinke	Green's Plns. W.	4/8/11
Goshawk	5 "	Paul Zerk	Cowell	28/9/10
Granger II.	5 "	F. W. Kloppe	Crystal Brook.	1/9/11
Hamlet	Aged	Brooks Bros.	Yorketown ..	3/8/10
Hardwood	5 years	H. A. Dennis	Tumby Bay ..	13/10/10
Hot Winds	Aged	W. Jones	Naracoorte ..	26/8/10
Huon's Honesty ..	4 years	W. A. Boutell	Jamestown ..	4/8/11
Jackwood	5 "	R. J. Bailey	Tarlee	28/9/11
King Malion	2 "	A. Burford	Angle Vale ..	13/9/11
Laban	Aged	J. S. Miller	Springton	15/2/11
Listen-to-me	5 "	C. C. Nitschke	Millicent	24/9/10
Lord Collingwood ..	11 "	R. J. Dennis	Adelaide	14/9/09
Maori Chief	2 "	R. J. Dennis	Wandearah ..	12/9/11
Marsden	6 "	T. O'Dea	Murray Bridge	23/3/10
McGrainger	5 "	Nicol & Sigston ..	Willunga	21/10/10
Morn Child	5 "	J. N. Hood	Colton	2/6/10
Nimrod II.	Aged	R. H. Burns	Milang	21/10/10
*Olympic	8 years	A. J. Thompson	Panitya, Vic. .	3/7/11
Osty	4 "	A. Reschke	Wilmington ..	8/9/11
Ostymarsh	6 "	F. E. Fisher	Strathalbyn ..	22/10/09
Otohuhi II.	2 "	A. L. Dunn	Ashbourne	13/9/11
Pawnbroker	Aged	J. R. Brown	Gawler	24/8/10
Ponto	4 years	F. J. Dunn	Petina	23/5/11
Producer	Aged	J. Grindall	Adelaide	14/9/09
Progress	5 years	R. J. Mudge	Streaky Bay ..	22/5/11
Rafykmarsh	4 "	J. Tee	Milang	28/9/11
Rex Roy	6 "	H. A. Dennis	Tumby Bay ..	13/10/10
Romeo II.	Aged	W. A. Bennett	Windsor	14/7/10
Simulator II.	6 years	H. Haydock	Gawler	22/9/09
Sir Grainger	4 "	T. Drage	Laura	5/7/11
Sir Thomas	5 "	J. Dodd	Meningie	14/10/09
Spanker	5 "	J. N. Jacobs	Cowell	23/8/11
True Blue	Aged	E. Denison	Auburn	3/8/10
Van Tromp	5 years	R. J. Dennis	Crystal Brook.	7/9/10
Warrior	5 "	D. Goldsmith	Yorketown ..	2/8/11
Whitebait	Aged	H. R. Raye	Yankalilla	5/11/09
Whitefoot	6 years	F. Starkey	Wilmington ..	20/9/10
Young Fisherman ..	5 "	G. A. McDonald	Ororoo	6/10/10
Young Grainger ..	4 "	Chas. Ramsay	Willamulka ..	4/8/11
Young Workman ..	Aged	A. Boutell	Jamestown ..	5/8/10
<i>PONIES.</i>				
Abdalla	9 years	J. P. O'Shea	Eudunda	29/9/09.
Agrippa	3 "	P. Charley	Narrung	26/10/11
Alexandria	Aged	Hon. R. W. Foster ..	Quorn	28/7/10
Aroona	5 years	J. Beckhoff	Snowtown	15/8/11
Australian Spy	5 "	J. I. Maxwell	Saddleworth ..	9/8/10
Australian Scout ..	Aged	S. Thomas	Echunga	9/3/10
Black Boy	"	R. T. Pycroft	Stockport	28/9/11
Black Prince	7 years	Mrs. A. A. McPherson..	Penola	2/9/10
Blondin	7 "	E. J. Barraud	Lipson	13/10/10
Blue Gum	Aged	W. Kinghorn	Mt. Gambier ..	20/10/09
Boatswain	"	G. Bermingham	Robe	22/9/10
Bolliver	"	W. Richardson	Woodchester ..	15/9/09
*Bounding Willow ..	8 years	A. H. Koop	Edithburgh ..	3/8/11
Bracco	3 "	J. A. Naismith	Black Rock	3/10/11
Brigand	Aged	M. J. Howard	Gawler	22/9/09

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
<i>PONIES—continued.</i>				
Brat.....	Aged	Yalluna Station.....	Tumby Bay ..	28/7/11
Cardo	4 years	Warren Bros.	Warrenda	16/8/11
Chummy	Aged	W. E. Lovell	Adelaide	22/9/09
Comet	5 years	A. E. Fawcett	Kapunda	5/9/11
Commander	5 "	E. J. Banks	Robe	22/9/10
Commodore	Aged	O. Gaden	Mt. Gambier..	20/10/09
Commodore		W. Roy	Devon Downs ..	14/6/11
Commodore	5 years	R. K. Kitto	Moonta	22/9/10
Cymbell	5 "	W. R. Cross	Mt. Gambier..	10/9/10
Cymro	5 "	H. W. Sambell	Petersburg	2/10/11
Czar Junior	5 "	Phil Brien	Bute, Kadina..	17/8/10
Dandy Burke	7 "	L. C. Pridham	Aldinga	27/10/10
Desert Boin	Aged	Yallum Estate	Penola	1/9/11
De Wet	8 years	E. C. Davey	Edithburgh	3/8/10
Duke of York	8 "	W. E. Jacob	Kadina	30/8/10
Ensign	Aged	A. J. Mortimer	Gawler	24/5/11
Fireaway	"	C. C. Nitschke	Millicent	22/9/10
Foreigner	6 years	J. A. Jaensch	Murray Bridge ..	23/3/10
Foreigner II.	7 "	W. A. Wilson	Naracorte	26/8/10
Foreign Oak	8 "	Tom Duell	Burra	29/9/09
Foreign Prince	7 "	C. B. Knight	Port Pirie	7/9/10
Foreign Spy	Aged	R. J. Bailey	Tarlee	28/9/11
Freedom	5 years	D. J. Morrison	Tantanoola	4/9/11
Furreed	Aged	Lisle Johnson	Saddleworth	8/10/09
Fureed Junior	3 years	E. G. Polgreen	Cowell	23/8/11
Gallant Crompton	Aged	C. H. Angas	Collingrove	5/1/11
General De Wet	6 years	Fisher Bros.	Bordertown	20/10/09
General Mac	Aged	J. H. McMorrow	Lucindale	26/8/10
General Tracey	5 years	T. N. Skinner	Bordertown	20/8/10
Glenroy	Aged	August Traeger	Tanunda	23/2/10
Glyndwr	"	Alex. McCulloch	Adelaide	13/9/10
Governor Bracy	5 years	A. A. Kilsby	Mt. Gambier	2/9/11
Guy	Aged	G. G. Mould	Strathalbyn	18/8/10
Happy Jack	"	A. MacKay	Mt. Gambier	20/10/09
Herd Laddie	"	F. Cooper	Mallala	3/8/10
Hero II.	"	W. Downs	Millicent	27/10/09
Hustler	"	D. M. Hodge	Laura	5/7/11
Ingomar	7 years	C. Egill	Mannum	13/8/10
King Billy	7 "	T. J. Aston	Mt. Gambier	13/10/09
King Cob II.	7 "	J. Dennis	Adelaide	13/9/10
King Commodore	Aged	Wilson Bros.	Orroroo	6/10/10
King Edward	"	J. J. Fahey	Adelaide	14/9/09
King Edward	8 years	J. Duell	Mt. Gambier	2/9/11
King George	Aged	P. Charley	Narrung	14/10/09
King George	3 years	Edward Hanns	Forestville	26/8/11
Kinglock	5 "	F. Leaney	N. Kensington ..	12/9/11
Little Jack	4 "	W. Barrows	Mt. Gambier	2/9/11
*Little Jack	5 "	W. A. Routell	Jamestown	4/8/11
Little Jap	Aged	H. Heaslip	Quorn	28/7/10
Little Toff	8 years	J. E. Linke	Balaklava	23/9/09
Little Warrior	Aged	H. Panell	Kadina	14/9/09
Max	4 years	P. G. Gülen	Snowtown	15/8/11
Maxwell	4 "	J. A. Jamieson	Blyth	15/8/11
Mickey	10 "	W. W. Howell	Adelaide	14/9/09
Mick the Foreigner	7 "	H. W. Surridge	Balaklava	3/8/10
Midnight	Aged	T. H. Morris	Kalangadoo	13/10/09
Mischief	6 years	M. Sullivan	Willunga	21/7/10

LIST OF CERTIFICATED STALLIONS—continued.

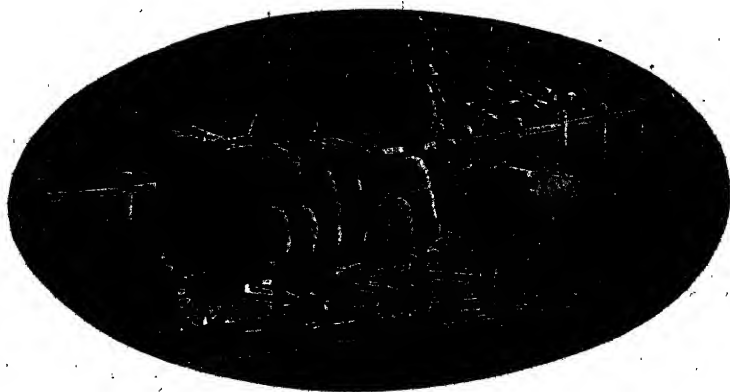
Name of Horse.	Age.	Owner.	Address.	Date.
PONIES—continued.				
Moses	Aged	H. Beach	Smithfield	14/9/09
Nero	7 years	Capt. G. Walters	Adelaide	14/9/09
New Warrior	3 "	W. Devine	Wallaroo	18/10/11
Nimble Dick	5 "	T. Rowe	Two Wells	6/10/10
Once More	3 "	S. J. Kelly	Hahndorf	21/2/11
Orion	Aged	F. Starkey	Wilmington	20/9/09
Paris	"	S. A. Wills	Beaumont	3/8/10
Paris Junior	5 years	W. A. Haskett	Cowell	23/8/11
Paris II.	5 "	C. Edwards	Hawker	6/10/10
Peter	8 "	M. Rogers	Kalangadoo	13/10/09
Peter	5 "	Jas. Robertson	Naracoorte	23/9/10
Ponto	Aged	B. Penna	Petina	23/5/11
Prince Almont	5 years	J. M. Hammill	Laura	27/7/10
Prince Edward	7 "	F. Martin	Minlaton	10/8/10
Raff	6 "	E. Day	Mount Barker	9/3/10
Rajah of Bong	7 "	T. Traeger	Eudunda	17/8/10
Raven	Aged	Jas. Williamson	Kadina	17/8/10
Red Gum	5 years	J. W. Rackham	Lucindale	13/10/09
Rexona	2 "	J. Myren	Meningie	26/11/11
Robin Hood	5 "	F. F. Saint	Balaklava	23/9/09
Roman Rung	5 "	F. E. Fischer	Strathalbyn	18/8/10
Roman Warrior	6 "	E. Fuller	Melrose	20/9/10
Rory O'More	Aged	A. Boutell	Jamestown	5/8/10
Rosmore	4 years	W. Grundy	Hindmarsh Is.	24/10/11
Royal Ensign	4 "	E. G. S. Neumann	Murray Bridge	21/2/11
Royalty	6 "	F. Richards	Adelaide	14/9/09
Royal Warrior	5 "	J. J. Fahey	Adelaide	9/7/10
Sandow	Aged	R. M. Hawker	Bungaree	17/10/11
Shirley Free Lance	7 years	C. H. Angas	Collingrove	5/1/11
Silver Fish	5 "	W. J. Hodby	Belalie North	4/8/11
Silver Fish	4 "	F. Starkey	Wilmington	8/9/11
Silver Gum	5 "	A. J. Howe	Mt. Gambier	2/9/11
Silver King	6 "	R. D. Tolmer	Naracoorte	26/8/10
Sir Charles	6 "	J. & H. Hurst	Truro	7/9/10
Sir Garnet	5 "	H. Mentha	Adelaide	13/9/11
Sir James	8 "	{ H. D. M. Adams	{ Athelstone	24/8/10
		{ W. D. Coulthard	{ Magill	
Smuggler	7 "	A. J. Berriman	Saddleworth	8/10/09
St. Elmo	7 "	A. Brown	Adelaide	14/9/09
Tam o'Shanter	5 "	W. Tiller	Balaklava	3/8/10
Tarella	5 "	P. J. McIntyre	Boggy Flat	18/8/11
Tetrarch	5 "	G. C. Neville & Sons	Balaklava	2/8/11
The Arab Brand	Aged	F. S. Hetzel	Gawler	18/7/11
The Duke	6 years	S. J. Dollard	Copwys	8/9/11
The Duke	5 "	J. J. Fahey	Adelaide	14/9/09
The Duke	8 "	W. Wallace	Adelaide	15/9/09
The Earl	5 "	H. Kent	Elliston	5/8/11
*The Kaffir	6 "	T. N. Skinner	Bordertown	20/10/09
The King	Aged	Mrs. W. E. Watts	Mt. Gambier	20/10/09
The Rising Sun	5 years	A. J. Kason	Cowell	23/8/11
The Sexton	Aged	G. Ganley	Hawker	6/10/10
The Toff	6 years	G. T. War	Cowell	28/9/10
The Welshman	5 "	Yalluna Station	Tumby Bay	28/7/11
Tim Whiffler	7 "	C. H. Boudry	Yorketown	3/8/10
Tipperary Lad	Aged	M. McCullum	Springton	23/2/10
Toff	8 years	J. P. Walker	Laura	5/8/10
Taffy	5 "	Warrenge Estate	Meningie	26/10/11

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
PONIES—<i>continued.</i>				
Tommy	Aged	O. G. Bartholomaeus .	Arkaba	5/9/11
Tommy Dodd	"	James Malone	Adelaide	6/7/10
Tony the Second	"	W. Gammon	Penola	12/8/09
Trigger	"	C. Harris	Adelaide	4/11/10
*Victor	"	W. A. Boutell	Jamestown ..	4/8/11
Victorious	"	A. J. McMorran	Millicent	3/11/09
Vitellius	4 years	D. L. McEwen	Warnertown ..	1/9/11
War Eagle	8 "	J. Reilly	Penola	13/10/09
Warlock	7 "	J. C. Scott	Mt. Gambier .	3/9/10
Warrior	5 "	Sir Samuel Way	Adelaide	14/9/09
Warrior II	4 "	S. Hocking	Walleroo	4/8/11
Warrior Chief	5 "	J. J. Fahey	Adelaide	9/7/10
Warringie	5 "	Stephens & McFarlane.	Cowell	23/8/11
Wee Gibbie	6 "	A. J. Walkley	Adelaide	14/9/09
Welsh Lad	5 "	W. Fuller	Yacka	7/9/10
Young Brigham	Aged	A. C. Follett	Mount Barker	19/10/10
Young Black Toff	5 years	C. Graeber	Mannum	13/8/10
Young Comet	5 "	E. Trezise	Walleroo Mines	4/8/11
Young Dividend	8 "	W. Agnew	Curramulka .	18/10/11
Young Fireaway	4 "	J. Marcus	Naracoorte ..	23/8/11
Young Rory O'More ..	5 "	C. Treagers	Auburn	15/3/11
Young Souter	Aged	W. M. Secker	Lucindale ..	27/8/10
Young Texas	5 years	J. Cowan	Murray Bridge	22/3/11
Zero	6 "	C. W. Flint	Penola	12/10/09

* Victorian certificate.

+ New Zealand certificate.



ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on October 4th, there being present Mr. C. Willcox (chair), Col. Rowell, C.B., Professor Perkins, Messrs. J. Miller, J. W. Sandford, G. R. Laffer, and G. G. Nicholls (secretary).

POLITICAL DISCUSSION AT BUREAU MEETINGS.

The action of the Bute Branch in introducing a subject of a political nature for discussion by the Branches was brought before the meeting in a letter from a member of one of the Branches. Members expressed regret that such a matter as an Employers' Defence Association had been brought into Bureau meetings, and it was decided to ask all the Branches to refrain from discussing the matter further.

RESOLUTIONS FROM CONGRESS.

Show Excursion Tickets.—The resolution from Congress requesting that the Commissioner of Railways should extend the duration of excursion tickets issued for the show to admit of the return journey being completed within four weeks of the date of issue, with the right to break the return journey at any station, was referred to the Minister of Agriculture, with the further recommendation that when a country passenger had entered the suburban area with such a ticket he should only be required to forfeit the forward half if he broke the journey.

Stud-book of Draught Horses.—The recommendation of Congress that a stud-book of draught horses should be kept by the Secretary of the Royal Agricultural Society and a committee of management appointed by the breeders was referred to the Minister of Agriculture, with the request that Professor Lowrie should furnish a report on the matter.

Demurrage on Trucks.—After considerable discussion concerning the difficulty experienced by those living at a distance from country railway stations in unloading goods to time, the board decided to request the Minister of Agriculture to ask the Railways Commissioner to allow 16 instead of eight hours for the removal of goods from trucks at country railway stations before demurrage was charged, and that stationmasters should promptly on arrival of trucks, wherever possible, notify the consignees.

Grain Sacks over 200lbs. in Weight.—In view of the fact that the size of the grain sack was limited by Commonwealth regulation, it was thought reasonable that the Chapman sack should be carried at ordinary rates, irrespective

of the weight of contents. The resolution from Congress, that the board should approach the Railways Commissioner with a view to securing an alteration of by-law No. 129, was therefore forwarded to the Minister of Agriculture, recommending favorable consideration.

Free Back Carriage from Field Trials.—The value of field trials of implements to the farming community generally was, in the opinion of members, sufficient to warrant free back carriage of implements sent to trials and not sold, and the resolution from Congress was forwarded to the Minister of Agriculture, with the recommendation that the Railways Commissioner be asked to grant this concession, as was the case with Show exhibits.

Veterinary Surgeons for Country Districts.—The following resolution from Congress referred to the Minister of Agriculture :—" That the Advisory Board request the Government to station qualified veterinary surgeons in various districts, with a view to their holding veterinary study classes and generally looking after the health of stock in the district."

NEW BRANCHES.

Two new Branches were approved as under, with the following gentlemen as members :—

Yabmana.—J. F. Robertson, F. A. Beinke, I. T. Robertson, A. Robertson, H. P. McCallum, A. W. McCallum, J. McCallum, F. A. Beinke, J. H. Frost, W. W. Lindsay, L. G. Strother, J. Penna, O. Bartel, G. W. Story, W. Schumann, M. Frost.

Riverton.—H. A. and W. B. Davis, J. P. Schultz, J. W. Kelly, F. Kelly, J. E. Kelly, R. H. Cooper, W. H. Davis, F. J. Sanders, A. E. Mitchell, R. J. James, F. Phillips, J. F. Ochme, W. Hannaford, A. Hannaford, W. Legoe, E. A. Gray, P. Gray, W. Lock, T. Camac, W. R. Fisher, W. H. Moss, W. H. Hart.

The following gentlemen were approved as members of the undermentioned Branches :—Messrs. A. Thomas, G. V. Linquist, and H. S. Thomas, Petina ; W. H. Collins and T. Hosking, Moonta ; C. E. Jacobs, Elbow Hill ; W. Blatchford, G. Charlton, J. McCloed, J. Mitchell, H. Blatchford, C. Reed, and R. Jacob, Geranium ; Wm. Nicol, Henry Dyer, Uraidla and Summertown ; A. W. Rush, Mount Bryan ; S. Cox and G. Andrews, Beetaloo Valley ; A. W. Shannon and R. Hantke, Keith ; Rev. W. T. Strahan, Maitland ; M. Hunt, Utera Plains ; A. Kuhlmann, Freeling ; A. N. Rupell, Renmark ; H. E. Watson, Coonalpyn ; A. Dunstan, Clare ; D. Kobelt, Mitalie ; M. F. Leverington, W. T. Richardson, and F. Brunes, Hartley ; — Short, Blyth ; D. Bradshaw, F. Hinge, J. E. Stoudie, J. Hayne, W. Green, and D. R. Trew, Tatiara ; M. M. Irvine, Wepowie ; Chas. Sanders, Jas. Duffy, W. Sanders, and R. Bairstow, Warcowie ; B. Miateke, and H. Mazkowiach, Moorlands.

The monthly meeting of the Advisory Board was held on November 8th, there being present Messrs. A. M. Dawkins (Chairman), C. J. Tuckwell, G. R. Laffer, A. J. Perkins, J. W. Sandford, J. Miller, C. J. Valentine, Chas. Willcox, G. F. Cleland, Col. Rowell, C.B., and G. G. Nicholls (Secretary).

NOXIOUS WEEDS.

The resolution from Congress concerning the destruction of noxious weeds was fully considered. After some discussion Professor Perkins proposed—"That the Government be asked to introduce a Bill to provide for new legislation for the destruction of noxious weeds, and to remove the administration of any regulations from the hands of the local governing bodies and to place it with the Department of Agriculture." He pointed out that the proposition embodied the spirit of the remarks made by the majority of the speakers on the subject at the Farmers' Congress in September. Mr. C. J. Tuckwell seconded, and said that from experience in his district he had come to the conclusion that it was very necessary that the administration of legislation dealing with noxious weeds should be removed from the councils. Col. Rowell said there was no doubt that in its present form the Act was a farce, and it was notorious that in many instances members of the councils and the councils themselves were among the worst offenders. Carried unanimously.

"EUPHORBIA TERRACINA."

The Secretary reported that, following on the recommendation of the board, false caper had now been correctly gazetted under the Noxious Weeds Act as *Euphorbia terracina*.

SHOW EXCURSION TICKETS.

The Secretary reported that in reply to a letter from the board the following minute had been received through the Minister of Agriculture from the Railways Commissioner:—"I have given this question consideration, and have decided that in future tickets issued in connection with the Adelaide Show will be available for return for a period of four weeks from the date of issue, but I cannot see the slightest reason for a break of journey, as asked for. Passengers holding excursion tickets issued to Adelaide from stations north of Dry Creek may terminate the outward journey at Dry Creek, Islington, Ovingham, or North Adelaide, and those from stations south of Blackwood, at Mitcham or Goodwood on forfeiture of the forward half of the ticket at the station where they alight. I do not think it is necessary to make any extension of this arrangement." Received.

DEMURRAGE CHARGES.

Demurrage charges on the railway, which had been the subject of a resolution at the Congress, were referred to, and a reply from the Railways Commissioner was dealt with. After consideration it was thought that the best

plan would be to ask the Minister to arrange for a deputation from the board to wait upon the Commissioner. The Chairman, Messrs. Willcox, Miller, Sandford, and Cleland were appointed to take this course.

LATE A. MOLINEUX AND F. E. H. W. KRICHAUFF.

Lifelike enlargements of the founder and first chairman respectively of the Agricultural Bureau were exhibited. These were presented by delegates to Congress for Roseworthy College. Members agreed with Mr. Laffer that it would be a good idea to display the portraits for a few days in a King William Street shop window in the city, so that the public might have an opportunity to inspect them.

SECONDHAND FERTILISER BAGS.

A resolution from the recent Hills Conference stated—"That this Conference expresses the opinion that Parliament should prohibit secondhand fertiliser bags being used to carry chaff and other produce." This stand had been taken because of the danger of stock and persons contracting anthrax and other serious diseases through handling such bags, and the Conference thought that the necessary provision might be made in the Chaff Bill. In the circumstances the Secretary had sent the recommendation on immediately, as the Chaff Bill was then before the House. The Parliamentary Draughtsman reported that it would be out of place to go further in the Bill than to prohibit the use of the bags for the carrying of chaff, and said that to do all that was desired it would be necessary to take other steps. It was decided to transmit the resolution to the Minister for consideration.

VETERINARY SURGEONS.

A resolution was received from the Shannon Branch suggesting that Cummins would be a central place on Eyre's Peninsula in which to station a veterinary surgeon for the benefit of the district. The matter was referred to the Minister.

CULTIVATING SALTBUSH.

At the instance of Mr. G. F. Cleland it was resolved to request the Government to arrange for experiments to be conducted on the upper northern farms in connection with the cultivation and improvement of various kinds of saltbush.

NEW BRANCHES.

Four new Branches were approved as under, with the following gentlemen as members:—

Hooper.—T. Nicolle, H. Nicolle, C. S. Hall, D. A. Beyard, O. A. Richards, R. Richards, A. W. Laurie, A. H. King, L. Haynes, O. E. Brown, C. Klose, C. Wright, — Pearce, — Pearce, A. Jury, J. W. Murphy, G. G. Pitt, E. G.

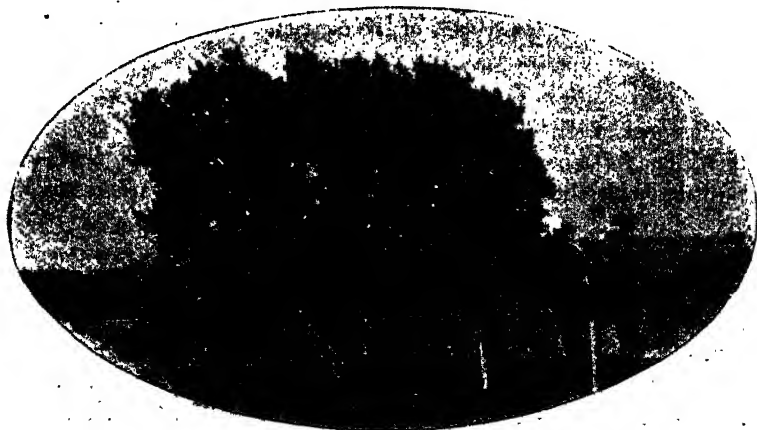
Colton, — Blackett, — Blackett, J. McDonald, A. Hood, O. Easton, P. Collins.

Ironbank.—W. H. R. Coats, W. Slater, C. Coats, C. H. Morgan, R. Coates, S. Evans, T. Coat, F. G. Brown, L. G. Shrews, G. H. T. Pole, W. Pole, G. Dalton, E. Wescombe, G. Hamilton, J. Coat, E. Coat, H. Coats, G. A. Coats.

Wirrega.—W. H. Goldsworthy, P. E. Prime, W. G. Haynes, L. S. Laughton, R. G. Langdon, J. L. S. Bice, H. H. Exton, W. R. Fairweather, R. Williams, C. Williams, M. Green, J. J. Green, A. Densley, L. Densley, F. Densley, C. H. Muer, J. Tassie, J. H. Horrocks, H. L. Fry, H. C. Rogers, L. J. Cook, W. Tilbrook.

Coorabie.—C. T. Giles, H. Roberts, A. Hardy, F. Andrew, W. H. Wheadon, H. Hobbs, D. Riddle, A. Gregory, C. B. Atkins.

The following gentlemen were approved as members of the undermentioned Branches :—G. Sinclair, Shannon ; P. Wundersitz, Maitland ; E. Kavanagh, C. H. Curnow, and A. Aitchison, Wirrabara ; A. Freeman and A. Erickson, Georgetown ; K. C. Moore, W. J. Fuller, and J. Sutherland, Woodside ; W. G. Watt, E. L. Stirling, and W. Hall, Strathalbyn ; T. Edgcombe, Millicent ; A. E. Talbot and E. E. Williams, Coonalpyn ; W. R. Goldsworthy and P. Wyly, Geranium ; A. Bairstow, W. Webb, and John Taylor, Warcowie ; E. C. Jenkins, Mitchell ; T. Higgins, G. Gilbertson, and A. Connole, Morphet Vale ; F. H. Winch and H. J. Mathews, MacGillivray ; Arthur Moffat, Penong ; W. J. Kirkpatrick, Kingston ; J. Havelburg, Quorn ; A. R. Gloede and E. J. Gloede, Wilmington ; J. Treloar, W. Gill, B. Steele, and J. Potts, Redhill ; H. Symonds, Bute ; W. Robertson, Coomooroo ; W. Batton, Green Patch ; J. C. Walters, J. Allan, and W. Frisby, Waikerie ; D. R. Trew, Tatiara ; J. M. Wray and A. Langleudecke, Naracoorte.



THE VALUE OF SILAGE.

COMPARISON WITH HAY, ROOT, AND OTHER CROPS.

“When one comes to compare the cultivation of silage crops with that of roots, there are two essential points in favor of the former. One is their smaller expense; and the other is their practical certainty. The farmer who makes silage can make certain of a store of food for the winter or for a time of drought. We have frequently alluded to the certainty of occasional droughts; and at this moment farmers, who have not made provision in the way of silage for the inevitable period of scarcity of fodder, will probably be regretting their incredulity and want of foresight. What has to be considered is: Is it better to run the risk of losing 30 or 40 valuable cows, or to expend from £100 to £150 in erecting a silo? The long drought of a few years ago surely supplied the answer. The man who depends entirely upon either his root or forage crops may find himself left in the lurch at a time when there is little chance of making other provision.

“So long ago as 1885-6, when there was an exceptionally severe winter in Great Britain, interesting evidence of the value of silage was abundant. The Royal Agricultural Society instituted an inquiry into the effects and lessons of that winter, and 350 replies were received from prominent agriculturists throughout England and Wales. In the schedule of questions was one referring to silage. Many of the correspondents replied that they had no experience on the subject, but the remarkable fact was established that, of all those who had used silage, everyone expressed a high opinion of its value. They all, with one consent, agreed that their stock could not have got through that winter, as they did, without it.

“At a Dairy Conference then held, Sir John Lawes said that it was probable that, when both hay and silage are of the very best quality that can be made, if part of the grass is cut and placed in silo and another part is secured in a stack without rain, one might prove as good food as the other. But it must be borne in mind that while the production of good hay is a matter of uncertainty—from the elements of success being beyond the control of the farmer—good silage, by taking proper precautions, *can be made with a certainty.*

“In our Queensland climate, with its uncertain and often unexpected rainfall, this consideration is no light one. In some seasons, such as we are

now experiencing in some parts of the State, the advantage in respect of independence of the weather is reduced to a minimum by drought; but, even if the haying be favorable, it is not always possible to secure after-math crops. If it were only for providing the means of saving second or third cuts of lucerne or millets, ensilage would be a boon and a blessing to farmers.

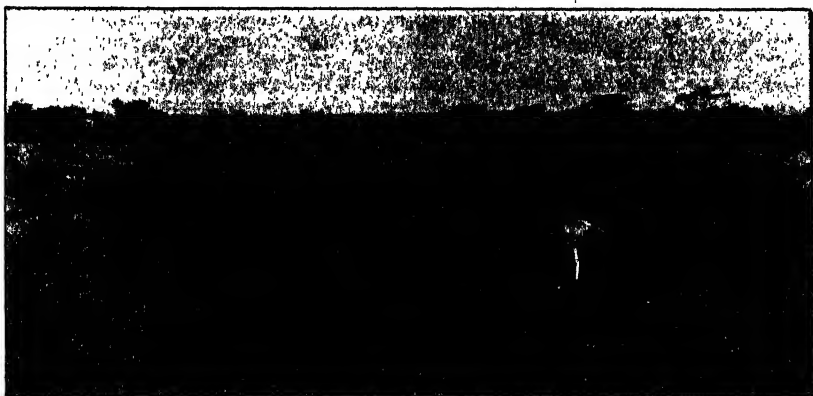
"There is ample evidence to prove that an acre of green fodder made into silage will keep a beast longer than either an acre of the same crop made into hay or an acre of root crops. Great loss of succulent nourishment takes place in drying the various grass crops into hay. About the same weight per acre can be grown of silage forage crops as of, say, turnips. In this way, a third of the acreage is saved, and the forage crop is the cheapest to grow. All experiments made in the old country (and these have been very exhaustive) have gone to corroborate the soundness of the opinion that grass made into silage will feed one-third more stock than when made into hay.

"As a food for stock, silage has the great advantage that, when properly made, it more nearly resembles the actual fresh grass than any other form of fodder. The necessary carbo-hydrates and nitrogen are even larger in the silage than in the fresh grass, while the small amount of acid (the silage being of the 'sweet' kind) is, no doubt, conducive to the digestibility of the food.

"Assuming that the relative feeding qualities of grass and silage are as nearly equal as analysis has shown them to be, the economy of the latter is very evident as compared with hay.

"We will say that an acre of grass will make $1\frac{1}{2}$ tons of hay. If so, it will certainly make 5 tons of silage and probably more. If we take the figures at $1\frac{1}{2}$ and 5 tons respectively, we find that, on a ration of 20lbs. per day of hay, an acre of grass will feed a beast for 168 days; on a ration of 50lbs. of silage per day, an acre of grass will feed a beast for 224 days. Thus, by making silage instead of hay, a food supply for 56 more days is obtained. Or, put it in another way: It will take 2 acres of hay to feed a beast for the same period that $1\frac{1}{2}$ acres of silage will feed it. This is a substantial advantage which no practical farmer can afford to overlook, especially in these times of high wages and high prices for food, when the first object of the dairyman is to get the largest possible milk returns from his stock at the least possible cost. All this applies to any crop which is capable of being turned into silage. Mention has been made of the certainty of silage. It is much more free from risk than either hay-making or root-growing. How often has the farmer lost an entire crop of lucerne in consequence of heavy and continuous rains setting in before he could save it as hay. With a silo at hand, there can be no loss owing to unseasonable rains. The man who has silage is never in danger of having to sell off part of his stock on a falling market (owing to many others being under the same necessity of getting rid of a part of their cattle

in order to save the rest) because of some sudden failure of crops either from adverse seasons or otherwise. He does not put all his eggs in one basket, as the farmer does who depends entirely upon the regular growth and harvesting of some particular crop. It is this reliability of silage which should earnestly commend itself to the dairy-farmer as his sheet-anchor in times of stress. In our semi-tropical and tropical districts, where periods of heavy rainfall and luxurious growth are often followed by seasons of burning heat, weeks of dry weather, and consequent scarcity of vegetation, the system of ensilage is manifestly of material benefit. The surplus fodder of the rainy season may be stored in succulent condition to supply food for stock in time of drought. In some of our Australian summers and winters a good supply of ensilage would mean the salvation of whole herds of cattle and flocks of sheep; yet thousands of acres of magnificent grasses on boundless treeless plains are allowed to remain untouched to be swept away by bush fires, when the stockowner finds himself obliged to rail his stock at great expense to relief country, while the dairy-farmer and the closer-settlement men—well, their only resource is to sell their stock at a ruinous loss, and practically begin the world over again, all owing to unbelief in the silo and in recurring droughts.”—*Queensland Agricultural Journal*.



STOOKING HAY AT ROSEWORTHY.

THE WHEAT MARKET.

Cables received from England during November indicated that in consequence of the continued very favorable reports received of the crop outlook in the Argentine, buyers were adopting a very cautious policy. This condition was reflected in the local market, which remained very dull, there being but little variation in prices during the month.

Reviewing the wheat position under date November 3rd, *Beerbohm's Evening Corn Trade List* states :—

No improvement can be reported in the wheat market during the past week, there being practically no demand whatever for cargoes, whilst the business put through in parcels has been small and mainly confined to Manitobas, the prices accepted at the close showing a decline of fully 1s. compared with a week ago, whilst most other wheats are 6d. to 9d. lower. The principal cause of the decline has been the continued favorable reports received regarding the outlook for the Argentine crop, which, provided the weather keeps favorable during the next few weeks, is expected to give a record yield. Good rains have fallen, and the dangers now to be feared are frosts this month and a wet harvest time. The importance of the Argentine as a source of supply during the first few months of the year, when that country has been favored with a good crop, is shown by the following tabular statement :—

ARGENTINE EXPORTS TO EUROPE DURING JANUARY TO APRIL FOR THE PAST FIVE YEARS (IN QUARTERS).

	1911.	1910.	1909.	1908.	1907.
January	750,000	426,000	1,128,000	1,333,000	650,000
February	1,242,000	1,417,000	2,874,000	3,102,000	1,774,000
March.....	1,467,000	1,003,000	2,807,000	3,878,000	2,025,000
April.....	1,689,000	1,115,000	1,173,000	1,789,000	2,041,000
Total	5,148,000	3,961,000	7,982,000	10,102,000	6,490,000

The yields during the past five years were as follows :—17,500,000qrs. in 1910, 16,500,000 quarters in 1909, 20,150,000qrs. in 1908, 24,500,000qrs. in 1907, and 19,100,000qrs. in 1906. This year's crop, with favorable weather conditions in the next two months, is expected to exceed that of 1907 by 2,000,000qrs. to 3,000,000qrs.; in the four months, January to April, following the previous record crop of 1907, the weekly exports averaged about 575,000qrs., whilst in the same period of 1910, following the small crop of 1909, the average was only 230,000qrs. It will be seen by the above figures how important the Argentine shipments are at a period when the exports from most other countries are on a reduced scale, and this will in all probability be more than usually the case this season, when the exports so far have been only about equal to the current requirements.

Cables from Australia have reported moderate to fair rains this week, but the probable yield is still estimated at about 25 per cent. less than last year. Even if such prove to be the case the crop will still be sufficiently important to permit of large shipments during the first six months of 1912. There is a moderate quantity of old wheat left in the country, and exports are expected to continue during November and December.

There has been a further considerable increase in *Bradstreet's* "visible" this week, principally in the Canadian figures, receipts at Winnipeg continuing very large; the total visible now amounts to 91,617,000bush., against 71,360,000bush. last year. The American markets have been very weak, closing prices yesterday showing a decline of 3½c. to 5½c.

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Nov. 6	—	3/5	3/8½	3/6 to 3/6½
7	Steadily held, but not active; Sept.-Oct., 4/6½	..	..	Do.
8	Dull and neglected ..	..	..	Do.
9	Unchanged; no demand ..	Do.	3/7½ to 3/8	Do.
10	Very dull; Liverpool steadily held ..	Do.	3/8½ to 3/9	Do.
11	Neglected, and lower to sell ..	Do.	..	Do.
12	—	Do.	..	Do.
13	Very weak, 3d. lower; Liverpool steadily held ..	Do.	3/8 to 3/8½	Do.
14	Very weak, 3d. to 6d. lower; Liverpool easier ..	Do.	Do.	Do.
15	Steadier, but not active; Liverpool steadier ..	Do.	..	Do.
16	Steady, but quiet ..	3/6	3/8	—
17	Do.	..	3/8½	Do.
18	—	Do.	Do.	Do.
19	Firm, held for 3d. advance; Liverpool firmly held ..	Do.	Do.	3/5½
20	Very firm, 3d. to 6d. advance; off coast, 4/6 ..	Do.	Do.	3/6 to 3/6½
21	Quiet, easier tendency; Sept.-Oct., 4/4½	Do.	..	3/6
22	Quiet; Liverpool, steady, but quiet ..	Do.	3/8 to 3/8½	Do.
23	Steady, but quiet ..	Do.	Do.	Do.
24	—	Do.	..	Do.
25	Steady, but quiet ..	Do.	..	Do.
26	Steady, but quiet; Liverpool steadily held ..	Do.	..	Do.
27	Quiet; Liverpool, steady but quiet ..	Do.	3/8; new, 3/7 to 3/7½	Do.
28	Dull and neglected ..	Do.	Do.	3/7
29	Dull, with easier tendency ..	Do.	Do.	Do.
30	Steadier tone, not active; Liverpool steadily held ..	3/5½	Do.	Do.
Dec. 1	Firm, but quiet; Nov.-Dec., 4/6 ..	Do.	..	Do.
2	—	3/6	3/7½	Do.
3	—	..	..	..
4	—	..	..	..

STEAMER FREIGHTS.—Steamers from South Australia to United Kingdom-Continent, full cargo rates 27s. 6d. per ton (8½d. per bush.). Parcela, Port Adelaide to London-Liverpool, 20s. per ton (6½d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SAILOR FREIGHTS.—From South Australia to United Kingdom-Continent, old wheat, 27s. per ton (8½d. per bush.); new season, 27s. 6d. per ton (8½d. per bush.); to South Africa, 22s. 6d. per ton (7½d. per bush.).

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on December 1st:—
BUTTER.

The long spell of hot weather experienced during the past few weeks has produced a shortage in the higher grades of butter, although the supply of cream is still good. As a consequence of the shortage the price of butter has risen considerably, the closing prices being—Superfine, 1s. 3½d.; pure creamery, 1s. 2½d.

A. W. Sandford & Co., Limited, report on December 1st—

BUTTER.—The dry, hot weather during the past month has been the principal factor in determining values. Not only are the exports of butter to the home market several hundred tons less than for the corresponding period of last year; but the heat wave has injured quite a quantity of produce coming forward, thus lessening to a very considerable extent supplies of choice lines. Therefore for these the market immediately responded, and a substantial advance was established for prime creamery and factory prints, but weather-affected lots suffered in price according to condition. At the end of the month the range of values at auction sales were as under:—Best factory and creamery, fresh in prints, from 1s. 1½d. to 1s. 3½d. per lb.; choice separators and dairies, from 11½d. to 1s. 1d.; medium quality lots, 9½d. to 10½d.; good stores and collectors, 8½d. to 9½d.; heated, 8d.

EGGS.—As a result of the continued heavy demand for choice lots of South Australian eggs, the rooms have been kept well cleared at higher figures than have ruled for several years. Prime guaranteed new-laid, full-sized hen eggs realised 8½d. per dozen; duck, 9d.

CHEESE.—South Australian factory brands are now well established on overseas as well as inland markets, and although the forwardings were extensive, sales have been freely effected at only a slight reduction on previous quotations. New makes from 5½d. to 6½d. for large to loaf.

BACON.—Curers have experienced an active month's trade for established brands of factory-cured sides, middles, and rolls, whilst hams are in decidedly better request in anticipation of Christmas requirements. Best factory-cured sides from 7½d. to 7¾d. per lb.; middles, 7½d. to 8½d.

HAMS.—In calico, 11d. to 1s. per lb.

LARD.—In skins, 5½d.; bulk, 5d. per lb.

HONEY.—Supplies of choice, clear extracted are now bare, and values are likely to remain firm, at any rate until the new take comes along. Present quotation, 3d. per lb., but medium flavored lots require some push to quit. Beeswax, scarce at 1s. 3d.

LIVE POULTRY.—No doubt the result of better times has caused an improved demand in this line, and in view of this, coupled with the near approach of Christmas, poulterers are busily purchasing for later requirements. Full rates are now obtaining for all prime table birds. Good table roosters realise from 3s. 6d. to 4s. 1d. each; plump hens and nice conditioned cockerels, 1s. 10d. to 3s.; ducks, 1s. 7d. for light weights, and up to 3s. 6d. for prime heavy sorts; geese, 3s. 9d. to 4s. 6d.; pigeons, 7d.; turkeys, from 9d. to 11½d. per lb. live weight for fair to good table birds.

POTATOES.—The heat spell more speedily ripened the new local grown potatoes from the plains adjacent to Adelaide. This resulted in an increase in the forwardings, when prices came back several shillings. Supplies are now being marketed at from 8s. to 8s. 6d. per cwt.

ONIONS.—Old season's are still in demand for distant markets. The new local grown are yet insufficiently ripe for forward journeys, and therefore are finding market at from 8s. to 9s. per cwt.

RAINFALL TABLE.

The following table shows the rainfall for November, 1911, at the undermentioned stations, also the average total rainfall for the first eleven months in the year, and the total for the first eleven months of 1911 and 1910 respectively:—

Station.	For Nov., 1911.	A'v'ge. To end Nov.	To end Nov., 1911.	To end Nov., 1910.	Station.	For Nov., 1911.	A'v'ge. To end Nov.	To end Nov., 1911.	To end Nov., 1910.
Adelaide	0.39	19.53	14.54	23.38	Hamley Bridge	0.01	15.49	12.04	20.82
Hawker	0.02	11.03	7.74	16.24	Kapunda....	0.14	18.77	13.41	23.32
Cradock	0.05	9.83	6.80	14.01	Freeling....	0.03	16.96	12.47	22.63
Wilson.....	0.05	10.68	6.40	16.90	Stockwell ...	0.26	19.41	14.53	21.68
Gordon	0.05	8.22	6.68	11.11	Nuriootpa ...	0.12	20.20	12.19	24.93
Quorn	0.06	12.90	7.24	17.89	Angaston ...	0.21	20.68	18.96	27.47
Port Augusta	0.05	13.84	7.51	16.81	Tanunda.....	0.16	21.00	19.75	28.42
Port Germein	0.15	11.48	9.35	19.27	Lyndoch	0.10	21.88	15.90	25.90
Port Pirie ...	0.31	11.97	11.90	24.60	Mallala	0.07	15.83	13.51	20.93
Crystal Brook	0.07	14.19	13.48	21.95	Roseworthy .	—	16.51	11.20	22.34
Pt. Broughton	0.10	13.42	11.40	20.14	Gawler.....	—	18.32	11.84	23.24
Bute	0.13	14.45	14.53	23.72	Smithfield ..	—	16.64	12.28	23.89
Hammond ..	0.17	10.00	11.32	17.95	Two Wells...	0.10	16.74	10.81	19.78
Bruce	0.05	8.37	6.24	16.79	Virginia.....	0.12	16.58	11.57	23.95
Wilmington .	0.22	16.77	14.04	24.19	Salisbury....	0.12	17.53	14.94	23.79
Melrose	0.26	21.81	15.47	30.64	Teatree Gully	0.20	25.13	17.37	29.70
Booleeroo Cntr	0.12	14.75	9.19	20.81	Magill	0.29	23.87	17.40	25.56
Wirrabara...	0.20	17.58	11.09	26.42	Mitcham ...	0.26	24.94	16.53	23.99
Appila	0.12	13.65	11.02	24.81	Crafers.....	0.55	44.24	37.35	51.15
Laura	0.27	16.62	13.42	28.62	Clarendon ...	0.54	37.48	26.82	24.30
Caltowie	0.32	15.95	14.10	22.43	Morphett Vale	0.52	22.42	18.57	25.88
Jamestown...	0.56	15.91	15.76	23.53	Noarlunga...	0.36	19.25	18.14	25.36
Gladstone ..	0.22	14.82	13.37	19.77	Willunga	0.46	24.91	23.95	32.82
Georgetown .	0.33	17.07	14.54	25.99	Aldinga	0.33	18.98	16.79	35.70
Narridy	0.12	15.89	14.67	20.32	Normanville .	0.61	19.76	17.85	28.22
Redhill	0.05	15.47	12.43	25.95	Yankalilla...	0.68	20.74	22.36	36.72
Koolunga ...	0.14	14.77	12.16	24.50	Eudunda.....	0.33	15.93	13.85	28.82
Carrieton ...	0.09	10.89	8.78	18.91	Sutherlands .	0.19	—	8.26	15.43
Eurelia	0.20	12.18	9.17	18.65	Truro.....	0.18	18.40	14.69	24.48
Johnsburg ..	0.12	8.94	7.31	15.19	Palmer	0.36	—	11.29	20.27
Orroroo	0.17	12.58	7.76	18.25	Mt. Pleasant.	0.13	25.91	18.76	29.93
Black Rock..	0.17	11.13	8.35	19.03	Blumberg ...	0.28	28.45	20.88	30.96
Petersburg ..	0.19	11.90	9.59	17.11	Gumeracha...	0.20	31.79	23.94	25.85
Yongala	0.20	12.66	10.92	17.94	Lobethal....	0.24	34.37	25.45	34.64
Terowie	0.15	12.41	10.13	20.56	Woodside ...	0.30	30.13	25.67	35.57
Yarcowie ...	0.16	12.64	11.44	20.78	Hahndorf	0.38	34.92	29.76	47.98
Hallett	0.20	15.37	12.61	20.64	Nairne.....	0.38	27.91	25.89	32.76
Mount Bryan	0.23	14.86	11.53	21.23	Mt. Barker ..	0.51	29.84	26.43	32.88
Burra.....	0.35	16.85	13.98	25.28	Echunga	0.49	31.26	29.34	37.96
Snowtown...	0.02	14.75	10.21	21.34	Macclesfield .	0.44	29.40	25.96	37.89
Brinkworth..	—	14.90	12.33	23.22	Meadows	0.70	34.10	30.79	43.06
Blyth.....	0.11	15.15	14.33	21.09	Strathalbyn .	0.49	18.18	18.66	26.18
Clare	0.26	23.27	19.43	30.57	Callington ...	0.28	15.04	11.67	18.34
Mintaro Cntrl.	0.12	21.10	17.62	37.60	Langhorne's B	0.38	14.63	11.77	24.39
Watervale ...	0.06	26.10	20.88	29.69	Milang.....	0.27	15.92	10.12	16.92
Auburn	0.07	23.10	18.47	31.21	Wallaroo ...	0.16	13.12	14.61	19.57
Manoora	0.11	17.26	12.68	27.47	Kadina	0.24	15.11	13.68	19.13
Hoyleton....	0.07	17.34	13.84	20.62	Moonta	0.21	14.35	12.66	16.72
Balaklava...	0.04	15.12	12.87	21.71	Green's Pina.	0.02	15.25	10.38	19.28
Pt. Wakefield	0.08	12.27	14.76	17.35	Maitland....	0.14	19.22	17.32	21.93
Saddleworth.	0.06	19.01	13.12	22.36	Ardrrossan...	0.12	13.19	11.57	17.14
Marrabel....	0.24	17.12	10.44	22.17	Pt. Victoria..	0.32	14.42	14.83	17.16
Riverton....	0.03	19.66	15.17	26.70	Curramulka .	0.19	18.03	14.62	23.17
Tarlee	—	16.61	11.87	21.02	Minlaton....	0.44	16.87	14.19	21.26
Stockport ...	—	15.36	10.56	17.53	Stansbury ..	0.63	16.30	16.07	20.51

RAINFALL TABLE—*continued.*

Station.	For Nov., 1911.	Av'ge. to end Nov.	To end Nov., 1911.	To end Nov., 1910.	Station.	For Nov., 1911.	Av'ge. to end Nov.	To end Nov., 1911.	To end Nov., 1910.
Warooka....	0.81	16.00	19.44	22.61	Bordertown .	—	18.78	13.28	20.04
Yorktown .	0.73	16.96	15.92	22.28	Wolseley....	—	16.67	11.95	21.39
Edithburgh..	0.56	15.85	14.21	22.56	Frances.....	0.04	19.29	17.18	23.57
Fowler's Bay.	—	11.86	12.35	12.07	Naracoorte .	0.14	20.99	18.11	26.32
Streaky Bay.	0.32	14.89	15.66	17.05	Lucindale ...	0.03	21.67	20.55	28.73
Pt. Elliston..	0.17	15.69	17.72	20.95	Penola.....	0.06	25.32	22.39	31.01
Pt. Lincoln..	0.22	19.35	17.01	24.13	Millicent	0.22	27.61	29.69	36.43
Cowell	0.07	11.22	10.37	13.00	Mt. Gambier .	0.34	20.91	30.64	41.48
Queenscliffe .	—	17.69	—	—	Wellington ..	0.18	14.27	10.95	18.74
Pt. Elliot....	0.58	17.05	16.37	23.45	Murray Bridge	0.33	13.33	10.11	20.62
Goolwa	0.32	16.94	17.07	24.51	Mannum ...	0.15	11.12	6.82	17.32
Meningie.....	0.26	18.08	14.02	21.92	Morgan	0.05	8.31	7.23	13.19
Kingston....	0.24	23.25	20.85	29.71	Overland Crnr	0.20	10.47	10.09	17.24
Robe	0.04	23.65	21.11	30.76	Renmark ...	0.21	10.06	9.66	14.71
Beachport...	0.09	25.86	26.75	39.77	Lameroo ...	0.06	—	12.43	17.29
Coonalpyn ..	0.04	16.62	13.14	16.67					

TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of 3,300 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Dec.	Jan.			Dec.	Jan.
Amyton	562	—	—	Millicent	595	12	9
Angaston	*	2	—	Miltalie	585	2	—
Appila-Yarrowie	*	—	—	Minlaton	*	9	6
Arden Vale & Wyacca	*	—	—	Mitchell	*	9	6
Arthurton	*	—	—	Monarto South	596	—	—
Balaklava	*	—	—	Monteith	*	—	—
Beetaloo Valley	†	—	—	Moonta	*	—	—
Belalie North	570	—	—	Morohard	567	—	—
Blyth	571	12	9	Morgan	*	—	—
Bowhill	*	—	—	Moorlands	*	—	—
Bowmans	*	—	4	Morphett Vale	591	—	—
Bute	*	—	—	Mount Bryan	*	2	—
Butler	†	—	—	Mount Bryan East	571	2	6
Caltowie	†	2	—	Mount Gambier	596-7	—	—
Carrieton	563	—	4	Mount Pleasant	592	8	12
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Clare	573	1	5	Mundoora	*	—	—
Clarendon	*	4	—	Nantawarra	575	—	3
Colton	582	9	6	Naracoorte	597	9	13
Coomooroo	584	9	—	Narridy	†	—	—
Coonalpyn	586	—	—	Northfield	†	5	2
Craddock	*	—	—	Parrakie	586	2	6
Crystal Brook	*	—	—	Paakeville	†	—	—
Cummins	*	2	—	Penola	599	2	6
Davenport	564	—	—	Penong	*	9	13
Dawson	*	—	—	Petina	*	—	—
Dingabledinga	*	8	12	Pine Forest	†	5	2
Dowlingville	*	—	—	Port Broughton	*	1	—
Elbow Hill	*	—	—	Port Elliot	592-4	16	20
Forest Range	588	—	4	Port Germeln	*	—	—
Forster	*	—	—	Port Pirie	*	—	—
Frances	*	1	—	Quorn	568	—	—
Freeling	574	—	—	Redhill	*	—	2
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Georgetown	*	9	6	Riverton	575	—	—
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Kalangadoo	*	9	13	Tatiana	*	2	6
Kanmantoo	590	2	—	Uraidla and Summert'n	594	4	—
Keith	595	9	6	Utera Plains	*	2	—
Kingscote	*	5	2	Waikerie	*	—	—
Kingston	*	30	27	Warcovie	*	1	—
Koppio	584	7	—	Watervale	*	—	—
Kybybolite	*	—	—	Wepowie	568	—	—
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Mannum	*	30	27	Yallunda	*	—	—
MacGillivray	590	5	—	Yongala Vale	†	2	—
Meadows	591	4	—	Yorketown	*	9	13
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* No report received during the month of November. † Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by GEORGE G. NICHOLLS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

Amyton, November 7.

(Average annual rainfall, 11 in.)

PRESENT.—Messrs. O'Donoghue (chair), Moten, M. and D. Corcoran, H. and H. K. Gum, Ward, Thomas, Crisp (Hon. Sec.), and two visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Farm Laborers' Blocks.—After duly considering the proposal, a resolution was passed in favor of surveying small holdings for farm laborers in new hundreds.

CARE OF BINDERS.—Mr. M. Corcoran dealt with this subject in a paper as follows:—
“Notwithstanding the fact that the success of a year's work may depend upon the binder, the neglect and abuse to which it is subjected by a large number of farmers is proverbial. It is not uncommon to see a binder stored away in the corner of the field where it was last used, or in some exposed part of the yard with the twine-box full of expensive pure Manila twine and the reel hoisted as high as possible as if it were desirable to have it thoroughly exposed to the breeze. By the time it is to be used again the master wheel will probably have sunk deeply into the soil, while the pole and neck yoke are allowed to rest on the ground. Nature, as if ashamed of the deplorable shiftlessness of its co-partner, will often hide the evidence of his neglect with a luxuriant crop of weeds. Under these conditions it is small wonder that the average life of a binder is short. While the farmer complacently measures its life in years, its real usefulness may be counted in days. A binder is used, on the average, not more than two weeks during the year, and it lasts about five years, which gives it a period of usefulness of approximately 70 to 100 days. That this time could be considerably increased by better care and management, and that neglect and mismanagement result in short-lived machines, improper work and large expenses for repairs is obvious. Considering the high price of binders, together with their comparatively short life and the short time they are used in each year, few better investments can be made by a farmer than that of providing adequate shelter. Before binders are put away after a season's work they should be gone over with the same care that a good engineer would bestow on his engine. All old grease and dirt should be removed from the surface as well as from the bearings; this can be done with kerosine and waste. The binder should be carefully oiled and all bright parts greased to prevent rusting. After the season's work is over is also the proper time to repair and overhaul a binder for the next year. At this time the operator knows, or should know, all the defects of the machine and what it needs in the line of extras and repairs to fit it for the next season's work. On the other hand, if the machine is put away without being given a second thought until it is needed again, the operator, if he still remains on the place, will have forgotten what the machine most needed. The result is that the binder is perhaps given a hasty inspection, which, in a majority of cases, fails to reveal anything and is brought out into the field with numerous small defects that could have been repaired at a nominal expenditure of time and money if given attention at the proper time.” If the farmer is too busy to attend to repairs immediately after the season's work is completed, he should at least find time to do the next best thing, which is to make a note of all defects of the machine with a view to remedying them when more time is available. Binders are often operated by inexperienced or careless persons, who, knowing nothing about the machine they are using, sit serenely in the seat and do nothing but drive. Such men are as surely out of place as they would be on an engine platform. A binder operator should understand the functions of every part of his machine, and, what is more, he should be able to make all necessary adjustments and repairs without the aid of an expert. He must know where to oil, when to oil, and how to oil. Many a good binder has been prematurely relegated to the scrap heap because of improper oiling. The man who gives his binder an oil bath when starting and then fails to oil again until it squeaks for more may succeed in using a great deal of oil, but his binder will soon wear out. All oil that does

not go into the bearings does more harm than good, as it serves to gather dust and grit which will work into the bearings. The proper way to oil is to use a little at a time and often. All parts of a binder do not need the same amount of oil, and the operator should decide which parts, by virtue of their work, need the most, and give them what is required." Members generally agreed with the ideas expressed in the paper. It was necessary to bestow the best of care on machinery in order to get the most out of it.

CAREFUL TREATMENT OF HORSES.—The following paper was read by Mr. G. Moten :—" Apart from humane considerations, the high price of stock at the present time should make the horseowner careful, for it costs a great deal more than formerly to replace animals that have become disabled by neglect or illusage. A horse is not only a highly strung, sensitive animal, but is also very clean and inclined to be dainty in his food and drinks. It is better, therefore, to give him good food and not too much at a time, for he, like ourselves, does not care to make the second meal out of what was left over previously, but prefers an entirely new feed each time. His feeding box should be cleaned out occasionally and the stable kept as sweet as possible, for horses do not enjoy wallowing in filth. He should have plenty of water, so that he can drink when he cares for it, as he is not likely to drink too much unless he is deprived of water for a time. A horse needs good water and will often go short for days when changed from one kind to another, as from well water to rain water. A good grooming is very beneficial to a horse. One English writer says that it does him more good than an extra quarter of oats. Horses need shelter either in a stable when working, or if out in the fields they need something to keep off the cold wind. Many people drive a horse or a pair of horses at a rapid pace on a cold night and then tie them up for a couple of hours. What wonder if their horses take cold or some worse ailment. A few shillings spent on a rug would make the animals comfortable and the owner would soon save the price of it in the smaller quantities of food required by the horse if in no other way. When a horse is ill or injured, he then, especially needs to be rugged or kept warm in cold weather, for one reason, because he has not the energy to keep himself sufficiently warm by moving about. In all cases of chill, colds, coughs, etc., he needs extra warmth and plenty of good feed to increase his animal heat. Horses need veterinary treatment at times. I once had a horse badly kicked on the thigh and was recommended to bathe the leg with hot water morning and evening, and rub it with a mixture of turpentine, white of an egg, and a small quantity of vinegar. In less than a fortnight the animal was quite well. In a pamphlet published by *The Register* entitled 'The Man on the Land,' by 'Agricola,' dated 1910, Veterinary Surgeon Desmond gives valuable information as to treatment for various complaints. Mr. Desmond makes some scathing comments concerning the practice of administering linseed or paint oil for sand. Instead he recommends feeding the horse on pollard gruels—well-boiled pollard mixed with a little bran and chaff. Its effect is to adhere to the sand and carry it gradually away." In discussing the subject it was suggested that a good plan was to put an empty nosebag on a horse if he had to stand in the wind after being hard driven on a cold night.

Carrieton, November 9.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Radford (chair), Fisher, Byerlee, Manning, Earl, Bearworth, Kraeger, and Book (Hon. Sec.).

MANURES IN CARRIETON DISTRICT.—Mr. F. Byerlee read the following paper on this subject :—" When discussing the use of super. for dry areas there are two points that present themselves. The first is, 'Will it pay?' the second, 'What kind and quality pays best?' After 10 years' experience in this matter I can emphatically answer 'Yes' to the first question as far as my own district is concerned. With regard to the second, it will take many years of experimenting before a decision can be arrived at, and even then fresh phases of the question will arise. The land on which I have experimented is poorer than the majority of the land in the district, but has a rather better rainfall. I first manured 20 acres of fallow, in 1901, and it averaged 5½ bush., against 3 bush. on the unmanured land. With the exception of 1902 this is the lowest average I have had. In 1902 the crop was destroyed by grasshoppers; otherwise I believe the manured wheat would have paid expenses. I have used from 40 lbs. to 80 lbs. of super., but so far have not found any advantage in drilling in the larger quantity. From 45 lbs. to 56 lbs. is the best dressing for this district. If it is intended to cut the crop for hay, however, about 70 lbs. can be used with advantage. In my own case I have found the extra cost amply repaid. With manure at £4 10s. per ton, which is a liberal estimate, ¼ cwt. dressing

will cost 2s. 3d. per acre; drilling costs, say, 1s. 6d., but this is not all extra expense, as there is no broadcasting to be done. Allowing the extra cost at 3s. 6d. per acre, we can be almost certain of an extra return of 2bush. per acre, which, at 3s. per bushel, leaves us 2s. 6d. per acre on the right side. I have known the difference to be as much as 12bush. per acre, but as a rule it has varied from 4bush. to 10bush. The second time land has been manured it has always returned a better crop than the first, and the third was usually a little better still, but this is possibly on account of the seasons. It will, however, be found that the first manuring will not have as great an effect as the succeeding dressings. In addition to the improved crop, the extra feed grown on the land will almost pay for the super. In seeding care should be taken that the cultivator cuts a level bottom, and that the shares are good. I have found it better not to cultivate deeply, but to a depth of about 2in. if possible. See also that the points of the drill hang evenly. This, combined with a level seed bed, will ensure a better germination than if it is uneven. It is best to drill as shallow as possible, so long as the seed is covered. For information as to the best depth to drill I would refer members to the October number of the *Journal*. With Federation wheat it is an advantage to drill slightly deeper if it is intended to harrow the growing crop, as this variety pulls out with the harrows more than others. I have found it best not to harrow immediately after the drill, but after the cultivator if possible, and have always found it profitable to harrow the growing crop. A rotation of various supers. could be tried with advantage. 'Wallaroo' is a very safe super. to use. It drills easily, can be sown dry with more safety, and, so far as my experience goes, has always grown a satisfactory crop. I have only used 'Globe' brand once—it was very sticky to drill. 'Wallaroo guano' is a manure too slow for this district, but the crop on it has stood the dry spring remarkably well. It may be found that an occasional dressing will do good. This year I used 'Mount Lyell' for the first time. This manure starts the wheat very quickly, and is keeping it very green; but it is all on stubble land—I am not comparing it with other supers. 'Jap' brand will, I believe, be one of the most popular supers. in the North. Great care must be taken in sowing it dry, however, or it will malt the wheat. I sowed a little last seed time on apparently dry fallow, and in less than three weeks green blades of wheat were showing up. Of course, that piece of crop is very thin. Crop sown with it after rain has maintained a good growth and a healthy color from the start, and it is likely to return over 20bush. per acre. I find Federation and Dart's Imperial about the best wheats to sow. Carmichael's Eclipse is a good variety where weeds are plentiful, as it starts quickly and makes a vigorous growth. Newman's Early is a good yielder, but goes down badly. Lindsay's Early is a good wheat for hay, but shells out easily. King's Early was not a success, but I believe with the College-selected seed it would be worth trying again. I have not had enough to do with manuring stubble to be able to say definitely whether it is an advantage or not, but I believe it will eventually prove so. As far as I have gone I have always found it pay, and I would not care to crop stubble again without super."

Coomooroo. November 21.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Berriman (chair), Brown, C. Brice, Avery, E. Brice (Hon. Sec.), and one visitor.

FENCING.—An instructive discussion took place on this subject. Members generally agreed that it was advisable to place a barbed wire on top of all fences. This discouraged the stock from rubbing against them. The Hon. Secretary said that for boundary fences posts could be placed 9yds. apart with two droppers between; six wires were required, but for division fences five would be sufficient. Droppers were preferable to standards, as the stock were less likely to bend the former than the latter. Mr. Brown thought if droppers were used they would involve a heavy strain on the wires, with the result that they would be always slack. Members considered No. 8 wire the most suitable for fencing. Steel wire was not good, because it was liable to break when being worked.

Davenport, November 9.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Roberts (chair), Sanderson, Bice, Messenger, Holdsworth, and Lecky (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Farm Laborers' Blocks.—After due consideration members felt unable to support the proposal that the Government should survey small blocks for holdings for farm laborers. In lieu of this proposal it was suggested that farmers should provide accommodation on their farms for laborers. Wages paid should be in accordance with the conditions obtaining during the different periods of the year. Wages during the ploughing, seeding, and harvest seasons should be higher than during the slack periods. The laborer would then have a home on the farm, and his remuneration would be in accord with the work he was called upon to do. He would be more likely to remain on the farm, which was a consideration to both the employer and the laborer himself.

FARMING AND THE FUTURE FARM LABORER.—Mr. Messenger read the following paper:—
 "Of all the occupations followed in Australia during the last 10 years none has received so much attention as farming. Thousands of acres of new land have been thrown open for selection, and in every case it has been over-applied for, which, without doubt, shows the faith Australians have in the productiveness of their land. We have vast scope for the application of all the latest improvements in farming. So great have been the changes and progress that the farmer and dairyman have been given a higher status than that which they formerly held. Colleges with instructors have been provided, journals and other printed matter have been circulated for the benefit of the man on the land, and we find as a result that the returns from the land are steadily increasing. The importance of practical as well as theoretical instruction has been recognised by our Governments, and the rising generation is being trained at numerous State institutions. The farm laborer of the future will need to be a very different man from the farm hand of the past or even the present-day laborer. In the past it was only necessary that he should possess strength and experience, and could drive a team of horses, guide a plough, or other implement to which they were attached; but in the near future it will be necessary for him to have a fair mechanical knowledge because mechanical appliances will perform the bulk of the work on the farm, and it will be the duty of the laborer to manipulate them. The motor plough is used all over the United States of America, and I believe on a few farms in Australia. The motor is used for all kinds of farm work, such as chaffcutting, pumping, &c. There is also the heavy tractor, which is being used instead of horses to draw the loaded wagon. If the farmer has a tractor he does not need so many heavy horses, but only a few to do the odd jobs about the farm, so you will see how necessary it will be for the laborer to understand these engines in order that he may give his employer satisfaction. Modern machinery is an expensive item to the farmer, but when we consider the saving in other directions, the increase in returns and the ability of the machines to accomplish more work in less time, we must admit that the present-day methods are far cheaper than the old-fashioned way." In discussing the paper a general opinion was expressed that if farm laborers received a certificate of competency from their last employer, and this was registered in the Labor Bureau, farmers would be able to select men for their special work.

Hawker, November 3.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. W. J. Pyman (chair), Rhymor, Moller, Feinler, H. C. Pyman, Hirsch, Palin, Wright (Hon. Sec.), and Dr. Fleming.

DRY FARMING.—Mr. G. H. Wright read the following paper on this subject:—"Wheat-growing on an average rainfall of 12 in. has always been a very uncertain business; but it is especially so when the variation between the fall in different years is from 6 in. to 22 in. Such a spasmodic rainfall as this gives us returns for our work ranging from practically nothing to 30 bush. per acre. We could improve our condition very considerably by adopting a better system of cultivation such as the one Professor Campbell has explained to us. Wild oats, mustard, sheepweed, Nancy Squash weed, and many other enemies of wheat infest our wheat land, and it is absolutely necessary that we get rid of these pests. If we do not we will utterly fail at wheat-growing. Campbell's system of cultivating, with modifications to suit our local conditions, will do this for us. Cultivation under this system not only stores and holds the moisture in the soil, but also eradicates the weeds. It keeps the moisture in the soil so that the seeds may germinate; and when this is done the next cultivation will kill them. To fallow a field he first discs it 3 in. deep one way and then cross discs it to the same depth and works this down fine with the harrows. Then he ploughs it, say for our soils, 5 in. deep, the plough to be

followed the same day by the subpacker and harrows. He keeps the surface to a depth of 3in. loose and fine right up to seeding time, and then harrows the growing crop after every rain until it gets too high for harrowing. By this time the crop shelters the surface of the ground and helps to retard evaporation. His first object is to get the soil into such a condition that it will take in the maximum amount of moisture. His second object is to keep it from evaporating after it has entered the soil. When the soil is fine it will absorb more moisture and retain it better. Moisture is held in the shape of films around each particle of soil. This being so, the more particles of soil there are in each cubic foot the more films of moisture will it hold. By taking 2 cub. ft. of earth, one out into 40 pieces and the other 4,000 pieces, and putting them out to dry separately, it will be found that the 40 pieces will lose their moisture much sooner than the 4,000. If you take a paddock that you are going to fallow and work a strip across it after the first rain, you will find after you have been fallowing for a few weeks and in the absence of rain, that the strip you have previously worked up will be quite moist and will break up nicely and in a mellow condition, while the other will break dry and cloddy. It is an excellent idea to prepare all the land intended for fallow in this way. We could keep on fallowing, with the land in perfect condition, for many weeks longer than we could otherwise. Campbell also tells us that moisture escapes from unworked soil by evaporation at about the rate of 15 tons per acre per week. At this rate land fallowed in June and left unworked until April—nine months or 39 weeks—would lose 585 tons or nearly 6in. of moisture, which is a very serious loss, especially if we get a dry spell of weather when the crop is growing. Add this loss to the average amount of rain we get while the crop is growing (8in.) and we have sufficient moisture (14in.) to produce a 16-bush. to 20-bush. harvest. That is quite double the average this district has produced. Under this system one team of eight horses should work 200 acres, allowing for two ploughings (if necessary), which could be done in 12 weeks. If you started ploughing on June 1st and finished on August 4th you would have from August 4th to September 30th for harrowing."

Hookina, November 10.

PRESENT.—Messrs. S. Stone (chair), P. and T. Kelly, B. and P. Murphy, Madigan (Hon. Sec.), and eight visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—After duly considering this question, members decided to afford it their unanimous support.

Farm Laborers' Blocks.—Considerable discussion ensued on this subject, and a resolution that the Branch support the proposal to survey small blocks in new hundreds for farm laborers was carried.

HARVESTING.—The Chairman read the following paper:—"The most important undertaking of the year on the farm is the harvesting of the wheat crop. This work should be completed as expeditiously as possible, in order to avoid serious loss from storms. No machine is better adapted to this than the complete harvester. Its simplicity of construction, ease of manipulation, and its ability to do creditable work in damp weather, place it far in advance of the ordinary stripper, and these virtues commend it to the agriculturist of to-day. This is strikingly exemplified by the large numbers of these machines to be seen at work on farms during the harvest months. This machine is so simple that any individual of ordinary intelligence can work it without the slightest fear of a serious breakdown or loss of time. Having the wheat reaped and cleaned in this manner obviates the necessity of extra labor for wheat-cleaning, which is a big item to the farmer. Wheat when cleaned with the harvester is also a much better sample than when cleaned with the winnower. Four horses will work a light-running harvester with as much ease as three will the stripper. The stripper, when heavily loaded or when working in loose sandy soil has a tendency to sag sideways, and in this way throws a lot of extra work on to the horses. The wide tires of the harvester will travel over the loose ground with little extra draught; thus a saving in horseflesh is effected. After seeing what is gained by using the harvester no farmer would care to return to the old-time laborious method of reaping and cleaning separately." A good discussion followed the reading of the paper. Whilst the majority of members supported Mr. Stone in his advocacy of the superiority of the combined harvester, some favored the stripper, chiefly because it saved the cocky chaff.

Morchard, October 7.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Scriven (chair), Kitto, Reichstein, Kupke, Jasper, Munro, Kirkland, McDougal, Mueller, Leskie, Rafferty, Toop, and McCallum (Hon. Sec.).

CARE OF FEET OF CATTLE.—Mr. Munro read the following paper:—"When purchasing a dairy cow most buyers pay little or no attention to the feet; yet it is an important point, particularly when cows have to be driven a considerable distance to and from pasture or water. Large, brittle, flat feet are objectionable. If the cow is not always running lame she is more or less crippled or tender on her feet. The foot of a cow should be neither too small nor too large, but proportionate to her size. She should stand well on the claws, which should not be long or overlapping, and the horn should have a firm, solid appearance. Among the causes of injury to cattle's feet are—dirt accumulating between the claws, which, on drying, causes soreness; small stones or pieces of stick getting fixed between the claws; wounds caused by nails and other rubbish; and, finally, gravel or dirt getting under the horn by way of the heel or otherwise and setting up inflammation. When an animal is noticed to be lame, the foot should be attended to at once. First find the cause and treat accordingly. In cases where the lameness is caused by dirt, small stones, or pieces of stick between the claws, the removal of the cause is usually sufficient; but where, through neglect, these have been in the foot for some time, it will be found necessary to keep the cow in for a day or two and dress between the claws with sulphate of copper ointment, composed of two tablespoonfuls of crushed bluestone mixed with the same quantity of lard. The addition of a little linseed or sweet oil keeps the ointment in a soft state in cold weather. Some use butyr of antimony and similar liquid preparations, but none of these are as handy to use or as good in results as the sulphate of copper ointment. Gravel or dirt under the horn of the foot frequently escapes notice. Should a superabundance of horn on any part of the foot be noticed, it will be found that this is generally caused by the presence of foreign matter underneath. The horn must be cut away till the cause of the injury, which is generally found to be dirt, is reached. But more must be done. Frequently the dirt will be found extending 3 in. or 4 in. along the foot. Of course when the gravel gets into the quick nothing can be done with the knife except to give opening for matter to escape. When blood can be seen through the horn, no further paring should be attempted. In advising paring I do not recommend the indiscriminate use of the knife. All sound horn should be preserved, and nothing removed but that which is necessary to give free egress to foreign matter. The foot should then be poulticed a couple of times, and recovery will be rapid if the foot has been properly pared. Gravel generally gains admittance through the heel. Should a cow's claws grow long, she is thrown back on her heels for support, a very tender place, into which gravel easily works its way." In discussing the subject Mr. Toop said the remarks made in the paper were equally applicable to bullocks. Mr. Kupke believed in keeping the horn of the foot short, especially if the cows were grazing on rough, stony country.

Morchard, November 4.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. E. J. Kitto (chair), McDougal, Reichstein, Kirkland, W. Toop, Parsons, R. Kitto, Muller, Rafferty, McCallum (Hon. Sec.), and two visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—The proposal to substitute the system of selling cattle by live weight for that at present in vogue was considered. Members supported the idea and thought it should be beneficial, especially so far as central markets were concerned.

Farm Laborers' Blocks.—The suggestion to survey small blocks in new hundreds to provide holdings for farm laborers was supported by the Branch.

STOOKING HAY.—This subject was dealt with in the following paper by the Hon. Secretary:—"I favor stooking after the hay has been lying in the sun for three or four hours, especially if there are wild oats in the crop. If left longer, portion of the seeds of the oats will fall when the sheaves are being moved to be placed in the stook. Thus, not only is the oat grain lost, but the seeds are left to grow when the land is cropped again. When the hay is placed in the stook just after it has been cut, care must be taken to see that the stocks are not made too large, especially if the hay is cut on the green side. I find it best to make a long narrow stook by placing two sheaves upright and then two on either side, with a slight slope to prevent the wind blowing them over. The stook may be made as long as desired, but it should not be made any wider than six sheaves as when the stocks are made in this manner the hay is easier to pitch on to

the vehicle for carting. I would not make stooks by laying the sheaves on the ground and placing sheaf upon sheaf. The sheaves may remain in a better shape, but the risk of damage is greater if heavy rains fall during the time the hay is in the stook. Stooking with the fork is much quicker than with the hand. I prefer a fork that has a handle of medium length. When starting a stook it is best to place the fork through two sheaves close to the band. See that the fork has a good hold of the sheaves, then stand them upright, leaving the fork still in the sheaves with the end of the handle resting on the ground. Then with the hand place a few sheaves around the two still in the fork. After this is done, draw the fork away. Do not throw the sheaves against the stook. If used properly the fork will save much walking and bending. I find a person can stook, on an average, about 15 tons of hay per day." An interesting discussion followed, in which members generally agreed with the views expressed in the paper. The Hon. Secretary also read a paper on "Haymaking" which had previously been read at Congress some years ago.

Quorn, November 4.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Thompson (chair), Noll, Cook, Schulze, Finley, Britza, Brewster, Patten (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION:—

Selling Cattle by Live Weight.—The matter of selling cattle by live weight was considered, and a resolution was passed in favor of this method of marketing.

Farm Laborers' Blocks.—This Branch, after full consideration, came to the conclusion that it would be an advantage to set apart blocks for farm laborers in those districts where the rainfall was sufficient to enable the occupant to put the land to good use, but were of opinion that the blocks should not be too large.

Wepowie, November 13.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Halliday (chair), T. E. and C. Pearce, Hetzel, Crocker, Knauerhase J. and T. F. Orrock (Hon. Sec.), and five visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Farm Laborers' Blocks.—Due consideration was given to this subject, and members unanimously expressed the opinion that the idea of surveying small holdings for laborers in new hundreds was a good one. The men would then be in a position to build homes for themselves, and their families should experience little trouble in securing employment in the neighborhood.

Willowie, October 3.

PRESENT.—Messrs. T. Hawke (chair), A. and F. Gray, Bristow, Greig, Howard, Blight, and Foulis (Hon. Sec.).

LIVE STOCK INSURANCE.—This subject was dealt with in a paper by Mr. A. Gray, in which he said—"Insurance of all natures, and especially the insurance of stock, in the long run pays the insurer. There are very few insurance companies who are making any great profit out of live stock insurance. It is only through the great care and wise judgment on the part of their agents that some of the companies are able to make the live stock insurance branch of their business pay its way, and there are some insurance companies that are losing money through this business. They continue it because one company does live stock insurance, the other companies have likewise to do so, to keep the business they have, and to make the live stock insurance a factor for more business in other departments. If a person goes to one company with his live stock insurance, he is also likely to do his hay and other insurance business at the same office. A thinking person has only to glance at the scale of premiums charged for live stock insurance to see of how great a risk he is relieved for the little he pays. A mare in foal, valued at, say, £60, for a premium of £2 4s. may be insured for £40 covering 30 days from the time of foaling. If the mare fails to survive the foaling the company pays him £40. He can also insure—under a combined policy—mare and foal for 30 days; the premium would be £3 4s., and if the foal died £4 would be paid to the owner. Should both die he would receive £44 for both mare and foal. The premium asked for taking the risk of a possible

loss that may and often does come to owners of valuable draught stock, and particularly brood mares, is small compared with the compensation it often secures; the amount which an insurance company returns to the insurer would pay the premium for insurance on a large number of similar stock. If the owners of insured stock do not require to claim on the insurance company they are fortunate, but such good fortune is scarcely likely to continue. There have been quite a number of cases in this and other districts, in which the insurance companies have had to pay compensation to owners for dead foals and valuable mares and foals. I am not now trying to breed horse stock. Had there been a live stock insuring company doing business in this locality 20 years ago, when I tried to breed horses, and had I availed myself of this safeguard, I should have pocketed several hundred pounds, which I lost through adverse circumstance." Mr. E. S. Bristow read a short paper as follows on the same subject:—"In my opinion it does not pay to insure mares. I have been interested in horse-breeding for the last thirty years, and find that out of 98 mares, which have reared 209 foals, only five mares died through foaling. Assuming the value of these mares to be £30 per head, at the present rate of insuring I would have paid £295 18s. in premiums, whereas the loss of the five mares only represents £100, resulting in a net gain to me of £195 18s." In discussing the subject, Mr. Hawke expressed himself as being strongly in favor of insurance, especially of heavy draught brood mares, which he would insure for the full term of 12 months. Mr. Bristow thought the risk was minimised if the mares were worked lightly right up to time of foaling. The Hon. Secretary opposed the principle of insurance on the ground that the aggregate paid for premiums would exceed the amount received in claims.

Wilmington, November 1.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Hannagan (chair), S. and D. George, Litchfield, McGhee, A. R. and E. J. Gloede, Schuppan, Hill, and Jericho (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION:—

Blocks for Farm Laborers.—Members of this Branch were unanimous in the opinion that it would be an advantage to provide blocks for farm laborers to settle upon,

Wirrabara, November 11.

(Average annual rainfall, 30 in.)

PRESENT.—Messrs. E. C. Stevens (chair), P. and H. Lawson, W. and W. H. Stevens, Kendrick, Pitman, E. and G. Hollett, Kavanagh, Thistleton, Bowman, Stott, Woodlands (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Members favored a trial of this system of selling cattle and decided to support the proposal.

Farm Laborers' Blocks.—The general opinion of members on this subject was that farmers should build working men's cottages on their own land. A resolution was passed "That this branch is not in favor of the Government surveying small blocks among farms for the use of farm laborers."

HAY-MAKING.—Mr. W. Bowman read a paper on this subject. It was important, he said, that the wheat should be cut at the right stage. If the hay was required for chaffing, it could be left until it had a full grain, but for feeding as hay it should be cut earlier. After cutting it should be left for from 10 to 14 days before carting. Stooking should be done as soon after cutting as possible; the slower the hay dried the better the sample would be. Stacks should not be built too large. He preferred a round-ended stack. When building it was advisable to keep the centre of the stack fairly high, to prevent the rain from soaking inwards. The roof should be made with the butts of sheaves outward. As the prevailing winds came from the west, it was advisable to build the stack so that the ends were east and west. A good discussion followed the reading of the paper. It was pointed out that the side of the butt of the sheaf, which was bent over, should be stacked downwards. There was a diversity of opinion as to whether it was advisable to roof with the butts inward or outward. Whilst one member thought it best to cover the stack with straw, another advocated the advantage of roofing with galvanized iron.

MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

Belalie North, November 4.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. A. H. Warner (chair), Fox, Arndt, Davey, R. and H. Atkin, Nugent, Smart, and Murdoch.

TROUBLE WITH COW CALVING.—Mr. Arndt referred to a Jersey heifer which had recently calved being affected with small hard lumps in the udder and teats. He tried to remove the trouble by rubbing olive oil well into the affected parts, but without success. He succeeded in reducing the affection by well rubbing the udder and teats and then drawing in a way similar to the milking process, when a stiff, cheesy, stringy substance was extracted from the teats, and then letting the calf suck the cow. Mr. Warner thought the trouble was caused by the cow catching cold in the udder. The best remedy he knew of was the one adopted by Mr. Arndt.

Leighton, October 30.

PRESENT.—Messrs. A. D. McDonald (chair), Warnes, McDonald, Gellert, Bailey, Morgan, Goodridge, McWaters, Fairchild, Jettner, Jeffery, Pearce, Pryde, Hams, McWaters (Hon. Sec.), and 26 visitors.

SHEEP AND WOOL.—Messrs Geo. Jeffery and W. Jackson (Wool Instructor of Adelaide School of Mines) delivered interesting addresses on this subject. Mr. Jeffery dealt with the class of sheep to keep, and strongly affirmed that the large-framed, plain-bodied type was the most profitable. They produced more mutton, and they could produce more wool because there was a larger surface on which it could be grown. He took the larger frame as evidence of a more vigorous constitution, and constitution was the bedrock on which to build. Dealing with the get up of farmers' clips for market, he recommended light skirting for flocks of 200 sheep, for flocks of 500 a little deeper, and for flocks of 800 it was advisable to take off all wool in which there were seeds. In all cases it was preferable to pick out any very inferior fleeces and send them in a separate lot, as otherwise they might spoil the sale of the whole clip. Mr. Jackson dealt with wool culture. He gave particulars of the qualities to be looked for in wools of different descriptions. He referred to the high standard attained by South Australian woolgrowers in the preparation of their clips for market. At the close of their remarks the lecturers were asked and satisfactorily answered a number of questions relative to the subject of their addresses.

Leighton, November 2.

PRESENT.—Messrs. A. McDonald (chair), Warnes, J. McDonald, J. and M. Hogan, Bailey, Pryde, W. and W. Bailey, Oates, Goodridge, Williams, McWaters, Fairchild, McWaters (Hon. Sec.), and four visitors.

THE FARM HOMESTEAD.—Mr. T. Goodridge contributed the following paper:—"The selection of a site for the homestead on a new holding is a most important matter. Do not select the land that you think is of no use for anything else. You cannot have a comfortable home in a situation like this. Pick a piece of the best land near the centre of the farm, so that you will not have to travel longer distances than necessary to your work. A gentle rise with a slope to the east is a good situation for a house, and if water is handy, so much the better. Having fixed on your site plan your house above the other buildings and build it on the top of the ground, i.e., do not dig out for the back. It is better to have a few steps up to the front door (which sets off the house) rather than a hole at the back. If possible build your house facing the east. Fence a strip on the north side for some hardy bushes for a breakwind. These are preferable to forest trees, as they do not grow so tall and they make a better break; also there is no danger from falling limbs. In the front have room for a flower garden, large enough for two or three shrubs as centre pieces. Do not fill it up with trees, but leave it to the ladies. They will soon plant it artistically. On the south side have a vegetable garden. Every landowner should grow his own fruit and vegetables. They are a great help to the upkeep of the house. I suggest placing all the buildings in a row. This economises space, and they are more convenient to work than if they are scattered. Have the men's quarters next the house; then the barn and implement sheds, and then the stables, which will be farthest from

the house. On the east side of the buildings have an orchard. It is more profitable for the refuse from the stables to wash into the fruit garden than to filter into the dam. On the west side, a chain and a half from the buildings, plant three or four rows of forest trees for protection from the westerly winds. A chain and a half is ample room for getting in and out with stock and implements, but two chains would look still better. On the east side of the orchard carobs would make a most effective hedge. These stand clipping well, and have a most pleasing appearance. They grow well in this district and are hardy. In discussing the subject Mr. Warnes considered the men's quarters should be some distance away from the homestead. Mr. McDonald urged the necessity of the house being built handy to the water supply.

Mount Bryan East, November 21.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. J. Thomas (chair), B. and W. Dunstan, I. and R. Thomas, Hughes, (Jare, Best, Wilks, Quinn (Hon. Sec.), and two visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Farm Laborers' Blocks.—After due consideration members expressed an opinion in favor of the reservation of small blocks for holdings for farm laborers.

Selling Cattle by Live Weight.—Members did not consider the proposal to sell cattle by live weight practicable.

LAMB TRADE.—The Chairman initiated a discussion on this subject, in which he pointed out the advantages and superiority of the carcass of the English Leicester cross.

TESTING WET WOOL.—A demonstration of the Sawtell Damp Detector was given by Mr. Dunstan. The instrument betrayed the presence of a very small amount of moisture in wool, and it was thought by members that it would be very useful for the purpose of determining whether or not sheep were in a fit condition to shear.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Blyth, November 2.

PRESENT.—Messrs. A. McEwin (chair), Zireek, Gell, Longmire, Ninnis, Williams, Coleman, Best, J. McEwin, Eime (Hon. Sec.), and one visitor.

HARVESTING.—Mr. H. W. Eime read the following paper on "Harvesting":—"During the past 50 years great improvements have been made in harvesting machinery. We have now three different means of harvesting our grain, viz., the stripper and winnower, the harvester, and the binder and thresher. A fourth is gradually being improved i.e., the combined reaper and binder, which promises to be in the near future one of the best machines in use. The harvester is the most extensively used in this State, being the cheapest and quickest method of getting the grain into bags. In newly-opened up country, where feed is scarce, and the ground is rough for binding, the stripper and winnower are more profitable; as the cocky chaff is valuable for feed. The binder and thresher is certainly preferable to the others if we can only get the labor to work it and a good market for straw. By binding the crop we keep the land free from weeds, which are fast becoming a nuisance, and we also get our crops into stocks early in the season, thereby checking the damage wrought by storms, &c. There would be no loss of grain with the easy-stripping varieties, as there is when they are left to ripen. Taking all this into consideration, I think the harvester the quickest and cheapest method of garnering grain in this district. The crop should be left until all the grain is hard. The farmer will find plenty to do until his crop is ready. First he should see if he has his crop well guarded against fire, and should plough wide firebreaks, not less than 18 furrows, around each paddock, whether it be near a railway line or not. Then he should see to his

harvesters, and give them a very careful overhauling, and not leave parts which become worn or combs which are become too wide. Such things will involve serious delay in the work. Loss is sustained in different ways through bagging the wheat too early. First there is the loss of weight if it is left in the field a few days. Then there is the danger of weevil getting into it, and if it is kept for seed wheat smut is sure to result the following year. Every farmer should deliver his wheat in such a condition as to be a credit to him. The best machinery should be used, as it proves to be the cheapest in the end, and, if possible, a farmer should try to work harvesters of the same make, as when a part or fitting breaks on one very often a spare part of the other can be made to fit it, and if the operator understands one, he understands the lot. It is also to the farmer's advantage to have all harvesters the same width in the combs. If one or two are wider than others the narrower ones have not their boxes full when the floor is reached. Before entering the crop the farmer should see that his machine is properly regulated according to his crop, more especially the fans and shake. An even team contributes considerably to the success of the harvesting. If the weather is damp the team should move a little faster than usual; if very hot a slower team is better, especially when one is working with easy-stripping wheats. As you will notice, with hot weather and a fast team the wheat will squirt out of the heads before reaching the beater. By having a steady team this waste can be prevented. Care should be taken to stand the bags in nice even rows when filled. Then when the sewer starts he is not bothered by bags leaning in every direction. A good way to start a new floor is to stand 10 bags in a row across the harvester strips; then start six rows either side, flat against them, always keeping the centre rows a little in advance of the outer ones—by this way four harvesters can be in at the same time, without hindering one another. The bags are easily counted when placed in this manner, and the sewer knows where to start, and sews from either end and stands the bags back. Then, when the heap is finished, he has a passage through the centre—ready for the horse to pull through when loading the wagon. The lifter is also right in the centre of the floor, which does away with the use of the sack truck, which, in my opinion, hinders the loading a great deal. It is not advisable to have too many bags on the one floor: 50 or 60 is sufficient, as it is quicker and easier to pull the wagon on than it is to drag the bags a distance to the lifter. Time is also saved when harvesting by having smaller heaps. Butts of wheat are generally a nuisance on a floor, and should be prevented when possible, as they hinder the sewer very much. The person sewing should always have a vehicle of some sort with him, so that he can take any butts left on to the next floor to be filled, and also take along all bags he empties. In this manner the floors are ready cleared up when the wheat is carted, and there is no danger of portions of bags being left in the stubble, to the danger of stock later on. It is to the farmer's benefit to have his bags sewn and carted away as soon as possible after the harvester has been through. If the bags are left open in the field the birds spill a certain amount of wheat, and if left long before carted the bags get slack and lose weight, and are more awkward to handle. In addition there is the danger of loss by fire and damage by rain; therefore the farmer should use every effort to get his wheat to the nearest railway siding as soon as possible. This harvest the farmer will not be able to market his grain as quickly as in former years, on account of the Railway Department's determination to close railway gates at 5 p.m., and at 1 o'clock on Saturdays. It is to the benefit of the whole State that the farmer should market his grain as quickly as possible; therefore the Government should not place this barrier in his way. The farmer should be allowed to market his grain at any hour of the day it suits him. After he has gone to the trouble and labor and expense of growing the crop why should he then be allowed an average of only eight hours a day to market it? If the wheat has to stay in the field until the harvesting is completed it should be stacked on logs, which prevent the bags from rotting underneath. When stacked in this manner wheat retains its weight, and, in case of wet weather, would be safe, and there would be no need to turn the bags. Screenings should be put into old bags, or, if old bags are not available, they could be put into new bags—turned inside out—and stood to one side. They can then be easily distinguished from the wheat. Every farmer should have a method of harvesting his wheat, and should see that that method is maintained by those employed by him. The workman should consider his employer, and not smoke while in the field harvesting. Men working machinery should give it every attention, by seeing that all oil-holes are cleaned before oiling, and that all lubricators are drawing freely. Any small breakage that may occur while at work should be mended as soon as noticed. This done, I am sure the harvest work would proceed in a pleasant manner, and with very little expense to the farmer." Considerable discussion followed the reading of the paper. Mr. McEwin had found it a good plan to make a note of any parts of the harvester that were worn or needed attention. He

put this note in the tool-box, and during the winter months had the matters put in order. He did not think that smut was encouraged by reaping the seed wheat when it was too green. Mr. Williams thought green grains were very often responsible for smut.

Clare, November 3.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. D. McKenzie (chair), D. Menzie, J. Scates, J. Berridge, S. Chambers, D. Forbes, J. Kollösche, P. Daly, S. Hicks, W. Pattullo, E. and G. Victorson, R. James, C. Jarman, A. Pycroft, S. Maynard, F. W. H. Lee, P. R. Pascoc, J. Dux, A. Dunstan, C. Scott, and P. H. Knappstein (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Due consideration was given to the proposal to sell cattle by live weight, but it was decided not to support the adoption of this method.

Farm Laborers' Blocks.—The Branch decided to give this proposal its support, as it was thought that the adoption of the idea would result in farmers being better able to secure the necessary labor.

SHOW JUDGING.—This subject was introduced in the following paper by Mr. Dux :—
“ Having visited several of our country shows during the last month, I have met a number of people who, like myself, were puzzled as to how, in many cases, the judge came to his decision. I have no doubt that official could have given a satisfactory explanation had he been asked for his reasons; and this explanation is what is necessary to let the thousands of people who visit the show know where one exhibit gained for merit and another lost for defect. I intend to deal chiefly with produce, but I cannot pass the most attractive class—the draught stock—without some comment. Side by side stand two animals; over one hangs the first prize ticket, above the other the second. Around them stands a group of men who evidently know a good deal about stock. They are puzzled, because in their own minds they agree that the second prize animal is the better of the two, and they are at a loss to know how the judge arrived at his decision. Now, if a judging-card had been fixed over each animal, showing the standard of points, and the number allotted to each by the judge, everything could have been explained, and one could have seen at a glance why he preferred the winner to the one which was more favored by the public. The allotment of a relative number of points for each separate excellence is by far the most satisfactory method, giving to each competitor the exact value of each feature. Let me illustrate—In judging bacon the judge should be provided with a card (the entry card would do), ruled into columns headed thus: curing, salting, texture, flavor, and appearance; while dried fruit might be awarded marks for grade, gloss, color, drying, and market; in fact, the wording could be varied to suit every class of exhibit. Certainly, it would be necessary to consult experts to get the correct headings for each class, but it would result in mutual advantage to the show and the exhibitor. Competition would doubtless be encouraged if every exhibitor could see how close he got to gaining a prize, and also in what respects his exhibit was wanting; he would naturally strive to remedy the defects before next show and then try again. Another advantage to be gained by the adoption of this method would be in dealing with cases where there was only one entry in a class. In many instances such exhibits are never examined, but awarded first prize no matter how inferior they may be. Or sometimes there is a regulation which specifies ‘two exhibits or only second prize awarded.’ Here the exhibit may be of the highest standard and yet receive only second prize. In my opinion, every exhibit, before being awarded first prize, should gain not less than 80 points out of a possible 100, no matter whether there be one entry or a dozen. Competitions such as field trials, pruning matches, or literary contests are judged by points; why not our show exhibits? The most effective way of bringing about this method of judging would be to make it compulsory for every society receiving a Government grant to adopt it. If this were done every show would become what it should be—an object lesson to exhibitor and spectator alike.” Mr. Jarman thought it would be possible to judge produce, fruit, &c., as suggested in the paper, but he did not think it was possible to do it with live stock, as it would mean more work for the judges and take up more time, which most members thought already too long. Mr. Scates did not regard any portion of it workable at a show. Mr. Kollösche thought the idea a good one, and produce especially could be judged by points as suggested if the judge was capable. Mr. Daly thought the idea a good one in connection with produce. Mr. Berridge did not think the idea was practicable in judging butter, as it would take too long. Mr. Forbes thought it was a matter of opinion with the judges, and he did not think it was possible for judges to judge by points

as suggested. Mr. Menzies did not think the idea practicable in regard to live stock, but agreed it might be possible with produce. Mr. Chambers thought judging was a matter of opinion, and did not favor the idea suggested in the paper. Mr. Lee did not think it was possible to judge fruit as suggested, as it was a matter of opinion with judges as to which was the best variety in its class. It was decided to send a letter of recommendation to the show committee urging the adoption of the suggestions embodied in the paper.

Freeling, November 2.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Elix (chair), Mattiske, jun., Kuhlmann, Neindorf, Koch, Block (Hon. Sec.), and two visitors.

VISIT TO ROSEWORTHY AGRICULTURAL COLLEGE.—Members of this Branch visited the college on October 5th, and were shown round by the Principal and the Farm Manager. The general attractive appearance of the farm was a matter of favorable comment, and it was thought that the experiments in rotation of crops being carried on would be of much value in the near future. The hand-selected seed wheat plots were favorably noticed, and the idea was expressed that considerable good should follow the addition of hay wheats to those already being grown, as a large amount of hay was being cut to supply demands from Sydney as well as the Adelaide markets.

QUESTIONS FROM CONGRESS FOR OPINION :—

Selling Cattle by Live Weight.—Members did not favor the proposal to substitute the system of selling cattle by live weight for that at present in vogue. It was thought that buyers in the trade were well able to judge the value of a beast without putting it on the scales.

Farm Laborers' Blocks.—The proposal to provide small holdings for laborers in new hundreds did not meet with the approval of this Branch, although it was thought that provision of the kind could well be made near townships and at seaports. The farmer should be able to supply his laborer with a cottage and the necessary land near the homestead more cheaply and better than it could be done under the proposed system. Quite possibly when he was most required at harvest or seed time the working man would be busy on his own block, and consequently unable to give the farmer the required assistance.

Mallala, November 7.

(Average annual rainfall, 18½ in.)

PRESENT.—Messrs. Konzag (chair), Nairn, Marshman, Temby, Worden (Hon. Sec.), Dr. Frayne, and one visitor.

NOXIOUS WEEDS.—The following paper was read by Mr. Temby :—"Members of the Agricultural Bureau should set an example in the matter of exterminating noxious weeds. The property of every member should be cleared of weeds, and this could easily be done if attempted at the proper time. The weeds should never be allowed to go to seed, but destroyed when young. United action is, however, necessary. How often do we hear the old query, 'What is the use of my trying to kill these weeds while my neighbors will do nothing?' The condition of some of the land in the district is a standing disgrace to the proprietors. Stock cannot feed among the weeds with any degree of comfort. In the case of sheep the value of the wool is affected considerably owing to the presence of burr. The suggestion of the Mannum Branch, that illustrations of all noxious weeds should be printed in the *Journal* in colored plates, with a description of each, so that producers would have a better chance of identifying them and checking them before they obtained too great a hold, is a good one. Soursops is one of the hardest weeds to eradicate, and it can only be killed by the soil being constantly worked for a number of years. Charlock is a great nuisance and difficult to kill. The potato weed is another useless plant which grows during the summer months, both on fallow and pasture land, and one that must be taken in hand in the early stages on account of its very large tap root. The skim plough is about the best implement to use in dealing with it. The cultivator will slip around the roots and leave the plants growing. What is commonly called star thistle is no doubt the worst of the thistle tribe, and each landowner should do his utmost to check this pest from spreading. Working the land as close to the fence as possible, and then hoeing where the plough will not run is the best means of getting rid of it. If large areas of grass land are covered it is advisable to plough a fire-break

in the winter, and then, in November, when the thistles are tender, burn the grass and so scorch and kill the thistles. Some councils send out their notices to landowners to destroy weeds early in October, and the time allowed for destroying the weeds expires before they can be found. November is quite early enough to start cutting thistles in this district. The paddy melon has made its appearance on the river, and I believe 'Salvation Jane,' or Paterson's Curse is to be found in the district. Wild onion is spreading very rapidly, and is hard to kill. The resolution recently passed by the Mount Remarkable Branch deals with the matter in a practical manner."

Nantawarra, November 1.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. W. Greenshields (chair), Sleep, Nicholls, Smith, Herbert, Sinclair, Uppill, Sutton, Tucker (Hon. Sec.), and two visitors.

FALLOWING.—The following paper was read by Mr. F. J. Sutton:—"If we are to make a thorough success of farming we must work the land scientifically and at the right season of the year, and endeavor at all times to fallow during suitable weather. The earlier the fallowing is begun the better. No fallow should be done after the middle of August. With fallowing in this district it is not necessary to plough any deeper than 3in. When we can get good crops off shallow cultivation it is not wise to plough deeply. By shallow cultivation the ploughing is much more easily overcome, and a very great saving of horseflesh, wear and tear on ploughs and cultivators is effected. For fallowing I prefer a plough with a 7-in. cut, as this cuts clear and turns the sod better than the wide-set plough. It is very important that all the soil should be well turned. After the land has been turned up for about a fortnight it is ready for the harrows. By this time the sun will have sweetened it, and any showers that may have fallen will have had time to reach the bottom of the ploughing. I prefer to harrow across the ploughing if possible. Choose a good set of harrows that will work well to the bottom, and go over twice as early as possible, breaking up the lumps to ensure an early germination of all small seed that may be in the land. The cultivating of the fallow is a very important point. Considerable damage is occasioned by working the fallow when it is too wet or too dry. If it is too wet the foot tracks of horses set down like bricks, and will turn up very lumpy at seeding time. The soil will not pulverise and work together as it will when worked in a moist state. It is better to work the fallow in a drier state than not to work it at all. As it is a mistake to leave the fallow just turned over with horses' tracks and lumps turned underneath. A spring-tooth cultivator is preferable to any other make of implement. This will shake the finer soils to the bottom and the lumps will come to the top. I would recommend every farmer to have a small set of harrows to draw after his cultivator; these, when drawn close behind the cultivator, break up the lumps while they are in a damp state, and seed that may be in the clods will germinate and a better tilth will be ensured to the top of the fallow. Every farmer should have a small flock of sheep to help him to keep his fallows clean. These will eat off any weeds that may grow after the cultivating, and at the same time help to work the fallow to a solid, moisture-retaining seed bed." In the discussion which followed Mr. Smith said he had noticed that lands fallowed in summer produced splendid crops. He thought an 8-in. cut better than the 7-in., as it turned the soil better. Mr. Uppill was of the same opinion. Mr. Sleep thought the depth of ploughing was to be governed by the nature of the soil. Mr. Nicholls would not cultivate when the land was dry. The writer explained that his experience was that it paid to cultivate the fallow even if the soil was dry. By way of an experiment last year he worked part of some fallow which was perfectly dry. The part cultivated was a big to the acre better than the other. Light soil, however, should be worked in a wet state. He favored working the fallow after harvest. Shallow ploughing was preferable, as the lumps came to the surface and the finer soil sank when the land was cultivated.

Riverton, November 2.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. Davis (chair), Schultz, Steacy, Sanders, Moss, Hart, Gray (Hon. Sec.), and one visitor.

CUTTING AND PRESERVING HAY.—Mr. H. A. Davis read a paper on this subject, in which he said it was very important to cut hay just at the right time. This could be ascertained

by grasping the head of the wheat with the hand and pulling. If it pulled away easily from the main stalk it was not yet ready for the mower or binder. Large sheaves were economical, because they saved a lot of handling. If the weather was close and warm it was advisable to stook close after the binder; but if cold weather prevailed, the hay could be left lying for a day or two. When the weather was warm a good round stook kept the hay a good color; but when cold or damp, a long stook, three sheaves wide, allowed a current of air to pass through the sheaves. Hay should be got into the stack as soon as it was fit to cart. Stacks should never be built north and south. When building the stack it was necessary to have a good thick bed of straw or cocky chaff for the bottom to absorb moisture rising from the ground. The middle of the stack should be kept nicely filled to prevent water running in. The roof should not be too steep, and the sides should be sprung about 2ft., so that the water from the roof would not drop on them. A good thatch should be put on as soon as possible. A good general discussion followed the reading of the paper. Mr. Moss had found that there was always more damaged hay on the south side of the stacks, which he attributed to the absence of direct sun on the hay. He thought it advisable to build the stacks north-west and south-east.

Saddleworth, October 20.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. Manning (chair), J. H. and W. T. Frost, Colebatch, Crawford, Eckermann, Scales, Graham, Coleman (Hon. Sec.), and two visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Stock by Live Weight.—After careful consideration of the subject members expressed the opinion that the expenses connected with this proposal would not be justified by the possible advantages.

Farm Laborers' Blocks.—It was thought that in dry or poor seasons blockers might be left stranded in a poor and dependent condition. The idea did not commend itself to members.

GROWING AND PRESERVING HAY.—Mr. W. Crawford read the following paper on this subject:—"One of the most important items to be considered in connection with the growing of hay is the preparation of the soil. A great many farmers hold the idea that it is not necessary to thoroughly work the ground from which they expect to cut hay. This is a mistake, as in order to grow good hay it is just as important to follow the ground and work it well (so as to get rid of wild oats and weeds) as it is to work the land for growing wheat. If the average farmer does happen to grow a bit of choice hay, he generally feeds his own horses with it, and the merchant has to take the poorer stuff. One of the best hay wheats is White Tuscan. This has a fairly green straw right down if cut at the proper time, and there is no brown flag about it, to which Sydney buyers in particular take exception. It grows high and is a good weighing variety. Bluey is also in the front rank of wheats for hay. It weighs splendidly, keeps a good green color, and makes excellent chaff. Another favorite is King's Early. This has a fairly solid straw, keeps a beautiful green color almost to the roots, weighs well, and cuts a fine sample of chaff. Some may condemn this variety on account of the beard, but this makes very little difference so far as selling is concerned. Baroota Wonder and Marshall's No. 3 are also good wheats for hay. Purple straw wheats are much better than white. Early varieties are not as a rule good wheats for hay, for the reason that they are more brittle in the straw. I consider Federation suitable for a farmer's own use, but it is not the best for market. Horses seem to eat it well, but it cuts up into rather poor-looking chaff. Horses do not like Yandilla King. The best time to cut the hay in order to get a first-class sample of chaff is when the bloom is on the wheat. You then get both weight and quality. If you leave it until there is a full or nearly full grain you are losing both weight and quality in the straw and will not make the quality of chaff. Cut the wheat whilst it is in the bloom, whether it is for your own use or for market. When dealing with Sydney we are continually receiving samples of their local Hunter River chaff in order to show us their requirements. Color is everything to them; in fact, they are rather adverse to grain, preferring rather to put this in themselves, maize being used for feed in very large quantities. In order to obtain a bright green color hay should lie for one full day after cutting. If you stook it up close behind the binder the hay will become a dull dirty green. Even if made into small stooks, it is inclined to sweat. If left for a day, the sun dries the outside of the sheaves and makes it a much brighter green, and it is much sweeter. Some will argue that by allowing it to lie they are losing weight, but this is not so. Men who make it a rule to keep one day behind the binder grow some very weighty hay. Of"

course, if it should threaten rain the hay would undoubtedly be far better standing up than lying down. On the other hand, the hay may be left lying too long after being cut. To leave it three or four days is a great mistake, as the sun dries out the moisture and sap and ruins the quality. It is best to stack four or five sheaves wide and as long as is convenient. Round stooks are suitable if put together carefully, and not made too large. Very large stooks are a failure in any weather. Some farmers say they make large stooks in order to retain weight, but this is a mistaken idea, as when hay begins to dry out after sweating or rain has fallen on it it loses weight. Should rain fall while it is in the stooks the small and medium sized stooks will retain their quality, as they dry out quickly, whereas the larger stooks will tend to turn black. The time to cart and stack hay is a matter that is entirely dependent upon the weather. Ten to 12 days of good drying weather are far better than three or four weeks of damp, dull weather. When hay is fit to stack the quicker it is put together the better. Hay does not gain in weight or quality by being left out too long, but it gets dry and brittle and will never out the same, however much it is damped or steamed. It is fit to stack when it will crack at the knots. If it will not do this, it is too sappy and a great risk is run in stacking it. It is better to be a day or two behind in stacking than to have to tear the stacks to pieces again as many had to a couple of years ago. Farmers can start to stack for their own use several days before the merchant dare start, as where the former gets three or four loads a day into a small stack the latter gets perhaps 20 or 30 loads into a large stack, and it has no possible chance of drying out. If hay is put into the stack in good condition it will come out well, but if allowed to remain in the field for weeks, after it is fit to cart, it goes into the stack dry and brittle and comes out much the same, and it can only be expected to cut up into dry, dusty, inferior chaff. A good bed of straw should be put down on which to stack hay, so as to protect the bottom sheaves as far as possible. I would rather mix a dozen top sheaves than one bottom sheaf; the latter have such a strong musty smell that it does not require many of them to spoil a truckload of chaff, and, in my opinion, they are very injurious to stock. The stack should be allowed to spring a little on the ends and sides so that water running off the roof will drip clear of the walls, instead of running down the sides; as otherwise if the centre is not packed full the water will enter the sides and find its way right into the middle of the stack. The most important feature in the preserving of hay is the roofing. You may sow good seed, cut the crop in excellent condition and stack it at the right time, but if you do not cover it properly your previous efforts will be in vain. There is as yet only one way to cover haystacks satisfactorily, and that is with a good thatch, properly put on. It is by far the best to keep rain out, and even though indifferently carried out, it will run the rain off far better than loose straw. The expense connected with thatching compared with other ways is only perhaps a few days' labor extra in putting it on, a ball of binder twine, and a few sticks. The latter, if taken care of, will last for several seasons. On the other hand, less straw is required. One load put on in thatch will keep out more rain than three loads put on otherwise. Moreover, there is only one farmer out of every 10 that knows how to put loose straw, or dry weather thatch, on properly. Very often this has to be done two or three times between January and April, and by that time part at least of the stack is spoiled, and a big patch on the side or a south-west end is left exposed to the rains right through the winter. Mice do less damage under thatch than they do under loose straw. We have proved this when shifting stacks in a season when mice have been plentiful. There are several kinds of sheeting on the market for covering stacks, but they are all more or less a failure. For a small quantity of hay for farmers' own use, an iron shed is best, as this in the end proves the cheapest, but if you have stacks all over your farm you cannot build sheds over each. It should be realised, however, that time spent in protecting hay will always prove to the farmer's advantage in the end." The various points raised in the paper were generally indorsed by members. Some considered that money spent in the building of hay sheds would be amply repaid.

Salisbury, October 3.

PRESENT.—**MOSES.** MOSS (chair), Sayers, King, J. E. V., A. J., and A. H. Harvey, McNicol, Bagster, Tate, Goodall, Frost, Bussenschutt, Whittlesea, Sexton, McGlashan, Short, Shepherdson, Ilman, Evers, Coker, Neale, Judd, Patterson, Hooper, Kuhlmann, Wilwin, and Jenkins.

SOIL FERTILITY.—Mr. Mueller contributed the following paper:—"At the recent Farmers' Congress," he said, "the conviction was forced on my mind that farmers were anxious to learn, and eager to acquaint themselves with the most up-to-date results of scientific research, as well as with the agricultural work carried on by others. We have

experienced a series of prosperous years, but we are reminded by the great philosopher that 'When fortune means to men most good, she looks upon them with a threatening eye.' Let us take heed of this before it is too late, and maybe, that there are ways and means available to prevent disaster, which in a slight or aggravated form may overtake the agriculturist more unsuspectingly than any other person, whether it be in the form of drought, storms, floods, exhaustion of soils, or plant diseases. With the exception of storms and floods, these are preventable or can be modified in their effects. The farmer's object is to raise from a given extent of land the largest quantity of the most valuable produce at the least cost, in the shortest period of time, and with the least permanent injury to the soil. Successes and failures, according to the individuality and capacity of the farmer, are the means whereby progress and improvement become possible. To master the principles of agriculture is at present not easy. It is recognised that the great majority of farmers cannot be expected to possess all the technical and scientific knowledge appertaining to their calling, and for this reason the Governments of many nations come to his assistance by establishing agricultural colleges, experimental farms, appointing experts to give advice on different branches of husbandry. Scientists appear and provide suitable fertilisers, engineers apply themselves, manufacturers are busy in offering the most up-to-date time and labor-saving appliances, and the laborer is called upon to do his share; but this does not relieve the farmer of his duty to investigate and experiment for himself and to second the efforts of others. It is not necessary to be an analytical chemist to detect the wants of a soil and suggest remedies; in fact, it is generally conceded that it is possible for an analysis to show a surfeit of all the plant foods and yet the crop may starve from a shortage in nutritive matter in an available form; and again, as the farm area is of vast extent, it is impossible to determine a general result. A farmer cannot do better than ask a few pertinent questions through a few experimental plots on his farm on subjects about which he is in doubt. These give the most reliable information. Does the average farmer know what food a plant requires, and how much of it, and whether it is in an available form in the soil? I venture a negative reply. Of the essential plant foods, phosphates, potash, lime, and nitrogen are the most important, while lime receives its importance more from the beneficial effect it has upon other soil ingredients and the physical condition of soils. Most soils store up vast amounts of plant foods, but these storages may be almost useless unless their availability is assured; consequently the necessary supply for a season's requirements may be wanting, especially in the case of essentials, which must either be supplied in the form of artificial fertilisers, or be made available in sufficient quantities through proper cultivation or other agencies. The continuous use of fertilisers containing only a single constituent of plant food must increase the draft upon the other nutritious elements in the soil, and the serious consideration of the effects of the continuous and sole application of superphosphate for a number of years in this State is forced upon us. Supported by favorable seasons, no serious results have been experienced, but can we calmly contemplate what might happen if a season of drought suddenly came upon us? Each season's tillage should be conducted in such a way as to be a complete preparation for a drought or other unfavorable influences. The returns would then be in excess of normal during a favorable season, and maybe retain their normal position under adverse conditions. Take the case of potash. Is it really of so little use that its application with super. can be neglected? Many of our soils, derived from granites, felspars, and traps originally contained potassic ingredients, but how much of this reserve is after continual drain still present in an available form? Many areas are quite destitute of this plant food, potash, especially in the case of light and sandy soils. In any case it will be the safest plan not to question the necessity or otherwise too closely, but put it into the soil and await results. The effect, I think, will be a revelation. Tests have proved conclusively that wherever there is a deficiency of potash the yield of carbohydrates (starch, sugar, &c.) is greatly reduced. Reliable experiments carried out by Hall revealed the fact that when potash was lacking the individual grains were small and undeveloped, but with each addition of potash the weight of grain and the quantity of starch increased. Further, we find that the potassic salts in the market on account of their free solubility expose them to the danger of being washed out beyond reach of the roots. This would certainly happen if it were not checked by reaction of the soil on the potash and forming potassic compounds that are insoluble. At Rothamstead the following results, extending over a large number of years, are recorded with reference to the effect of potash. A complete manure, containing all ingredients, returned in the years 1886 to 1892 an average of 38.8 cwts. per acre; without potash, 28.1 cwts.; with super. only, 23.3 cwts. In 1893 to 1902 the returns were 36.5 cwts., 21.2 cwts., and 17.9 cwts., respectively. Rothamstead also records the fact that the straw of the grasses, as well as the wheat and barley plants, was always weak and brittle when potash

was wanting. It is further stated that there is abundant evidence to show that potash makes the plant more resistant to the fungoid diseases. The wheat on the potash-starved plots is always subject to rust even in good seasons, when very little is to be seen on the other plots normally manured. An important effect of potash cannot be overlooked, as evidenced by the following results of a yield in a dry season. The potash-treated area returned 16·4bush. as against 7·7bush. on the potash-starved plot, and the weight of straw was 62·6lbs. as against 56·4lbs. per bushel. This was chiefly due to the potash preventing the ripening of the wheat too rapidly, as the ratio of grain to straw was 98·0 in the potash plots and only reached 87·3 in the plots without potash. Farmers should experiment, and probably important revelations may rise to the surface minimising the dangers from drought, rust, takeall, and other fungoid diseases. The difficulty at present exists in the absence of a good potassic fertiliser lending itself to mixing with super. and drilling in with the seed. In America and the Continent a new source of potash has been drawn upon with very good results, and which, in its application and effect, simply follows the course Nature herself adopts. Lime makes the texture of clay soils open and pliable, and has a binding action on sandy soils. It breaks up the forms of plant food, which lie deep in the soil, and makes them available. It neutralises the acidity of the soil, checks the waste of soluble fertilisers by combining with these; it decomposes matter and humus and beneficially affects bacterial activity. Howell points out that the absence of a sufficiency of lime in many parts of Victoria has been shown experimentally to cause reduced activity in nitrification; and he predicts that a judicious system of liming will improve the workability of the soil and give a greater resisting power to drought unless lime is already present in a carbonate form, and that, accepting the versions of the different experimenters, it might be admitted that there is a very large area in Victoria which might be expected to show marked advantages from liming. Many red soils I have examined show a great deficiency in lime matter. All plant foods, whether metallic or non-metallic (except nitrogen), are supplied to the plant by water, the air, or the soil. Notwithstanding some benefit being derived from fallowing, the exhaustion of the nitrogen element is the danger lurking ahead of us, as practically the whole problem of plant life centres around the supply and transformation of nitrogen, and it must be furnished by the soil. It must be very aggravating to the farmer to find that this very nitrogen, pressing in its pure state with a weight of about 12lbs. on every square inch of his soil surface, is beyond his reach and the reach of the plant in that particular form. Agriculturists until recently were not aware of the presence in the soil of the best friends they can ever expect to have in the innumerable micro-organisms, always ready to render a full supply of all the nitrogen required given suitable conditions and environment for development. It will be found before long that this immense army of workers present in each grain of normal soil will play a most important part in successful farming, with undreamt-of consequences, compared with which the application of artificial fertilisers alone cannot hope to enter into competition, but will form merely a secondary, though necessary, adjunct. The production, habits, and functions of bacteria I must reserve for another occasion, only making the general statement that the multiplication of bacteria is so rapid that, taking half an hour as a time limit of a complete phenomenon, 17 millions would be produced in a day, and enough to fill an ocean in five days. Bacteriologists have not yet ascertained the manner in which the different soil bacteria do their work, but for the present it is generally conceded that in the case of the nitrogen bacteria their sustenance is derived from the carbohydrates which the plant furnishes to its microscopical guests. These return the favor by supplying the plant with nitrogen by abstracting it from the air that is found between the soil particles. This living together of two organisms for mutual benefit is termed symbiosis, as opposed to parasitism, one living at the expense of the other, resulting often in the complete annihilation of one and ultimately of both organisms.

"INOCULATION OF LEGUMINOUS PLANTS.—Bacteriologists have now completely mastered the nitrogen bacteria, and cultures for the different leguminous plants, such as clover, vetches, lupines, peas, beans, and lucerne are now obtainable under the name of 'Nitragin.' Each variety of each kind of leguminous plant has its distinct culture. Some years ago a preparation bearing a similar name was placed on the market, but was a failure, partly from ignorance in the preparation, mistakes in the application, or both combined. Thus it happened that in some instances the culture, which had to be dissolved in boiled milk, was boiled with the milk and all the bacteria destroyed. The simply wonderful results obtained in Europe and America make it imperative to give the system a trial here. I shall repeat a few of the thousands of records available, which have been tabulated by the highest and most reliable authorities. The Agricultural Chemical Experimental Station of Halle, reports that the gain of nitrogen due to inoculation compared to the plot where inoculation did not take place, rose from 720lbs. to 1,445lbs.

The cost of a bottle of cultures to produce the large quantity of nitrogen was 7s. 6d. The cost of an equivalent result produced by nitrate of soda would amount to £22 18s. The weight of 660lbs. of peas from one plot not inoculated was raised by inoculation on another plot of equal area to 1,640lbs. Serradella (birds' foot clover) was increased from 416lbs. to 1,271lbs. The application of the process is extremely simple. The fluid containing the bacteria is sent out in bottles; the contents are emptied into a certain quantity of skimmed milk, which has previously been boiled, and the mixture poured over a heap of seed, which is then thoroughly mixed, placed into a drill, and sown in the ordinary way or broadcast. The gain of nitrogen to the soil is brought about by either ploughing down the first, second, or third growth of the leguminous plant, or by being satisfied with the stubble roots only, and utilising the whole of the green fodder, either as ensilage, hay, direct feeding, or pasture. But the gain through green manuring and the resulting benefits from nitrogen and humus are so great that the latter systems are as a rule discarded. Green manuring is practically untried in this State, but it can be predicted with perfect safety that once a few farmers have led the way in inoculation and the green manuring which becomes possible through inoculation, it will be generally adopted. Farmers complain that the soil is becoming much harder to work, preventing them from putting in as much wheat as formerly. Others again in districts where light sandy soils prevail complain that after a few dry days the soil is drifting and yielding to the pressure of the wind. Green manuring will overcome this difficulty as well as prove a safeguard against the farmers' strongest enemy—the drought. Other advantages of green manuring are that it enriches the soil in humus, binds light soils, and empowers them to retain moisture. Heavy soils are made friable and loose and the nutritious elements are more readily absorbed. It unlocks the mineral matter located at greater depths: it improves the physical condition of the soil; it promotes soil fermentation, and rids the land of weeds. It is a complete substitute for stable manure, incomparably cheaper, and its effects on succeeding crops are remarkable and noticeable up to four years after. It is within reason to state that if a farmer green manures one quarter of his area brought under cultivation each year, he will at the end of the fourth season have as perfect a tilth as practice can produce, rich in everything that is required to produce healthy growth. Collins reports the following results from crops grown after inoculated legumes—

A yield of 372lbs. increased after clover to 620lbs.

A yield of 932lbs. increased after clover to 1,304lbs.

A yield of wheat increased after clover to 64 per cent.

A yield of potatoes increased after clover to 50 per cent.

A yield of oats increased after velvet beans 300 per cent.

A yield of rye increased after peas 400 per cent.

An interesting comparison of the effect of fallowing and the use of inoculated legumes is available with the following records for three successive years:—

Wheat after fallow 4,220lbs. of grain, increased after inoculated clover to 5,180lbs., gain 22·7 per cent.

Roots after fallow 179cwts. of grain, increased after inoculated clover to 244cwts., gain 36·5 per cent.

Barley after fallow 2,103lbs. of grain, increased after inoculated clover to 2,991lbs., gain 89·8 per cent.

This does not take into account the removal, besides, of 3 tons per acre of clover hay, as against nothing from fallow. I must refer specially to one kind of legume that has changed infertile sand and moorlands into one of the finest dairy districts. It is the fodder plant known as serradella. From what I know of the plant it should prove extremely useful on all our light and sandy soils as well as on our heavy land. As hay it is superior to lucerne, and as greenfeed it is only second to it. It has this advantage over other fodders—when consumed green it does not produce inflation, nor does it affect in any way the aroma or taste of the milk, as lucerne does, and the seed is one of the cheapest in the market. At the Oregon Station in United States it grew 40in. high. The results in feeding it green were very satisfactory. Massachusetts reports that it greatly increased the milk flow when substituted for three-quarters of the ordinary hay rations. Comparing serradella hay with lucerne hay the following results appear:—

	Water.	Ash.	Protein.	Fibre.	Nitrogen	Fat.
Serradella	9·2	7·2	15·2	21·6	44·2	2·6
Lucerne	8·4	7·4	14·3	25·0	42·7	2·2

A word of caution is necessary whenever experiments are carried out or new ideas are given a trial. Wherever there are successes we also find failures. But the matter must not end with an unsuccessful effort; on the contrary, it should stimulate to increased exertions with the determined resolution to succeed. That climatic influences and soil

conditions must be favorable to lead to complete success goes without saying. It is so with all agricultural pursuits.

"ENSILAGE.—One more word as to ensilage. The serious consideration of food conservation is always before us, that the dairy may not suffer when Nature is not in her best moods, and supplies herbage but scantily. By systematic conservation of foods, drought, which has proved the ruination of many a well-equipped dairy, loses its influence, and the certain disaster which overtakes neglect in the branch will be prevented or much modified. Conservation of food is practised by cutting the crop for hay or for ensilage. Which of the two is more useful can be gathered from the following table compiled by Betley, the Public Analyst of Wigan. The plant is clover, and the crop was cut and grown on the same field in the same year. While the hay crop was the first, the ensilage was the second crop :—

	Hay.	Ensilage.
Albuminoid substances, water soluble	2.87	7.55
" " " insoluble	7.83	4.89
Sugar, gum, and extracted matter	47.31	53.44
Fatty matters, chlorophyl, &c.	2.96	3.11
Indigestible woody fibre	32.84	22.16
Mineral matter, soluble	2.51	5.71
" insoluble	3.68	3.14

Ensilage can be made of the roughest of grasses and the fermentation will make it palatable. In seasons of plenty, or almost in any year, large quantities of grass go to waste. But the better the quality of the grass plant the better the ensilage. Inoculation provides for a plentiful supply of the best fodder at the lowest cost. As machines are now obtainable with which to manufacture suitable cement and sand blocks for the construction of circular silos, tapering towards the bottom, every farmer is placed in the position to lay up a reserve in times of plenty for the time of need. A sufficient supply of moisture at the proper time and the presence in the soil of all the principal plant foods are as necessary for the successful production of legumes as for any other plant. Summarising what has been said, we find that as soil exhaustion is taking place—through the sole application of the superphosphate stimulant without replacement of other food elements withdrawn from the soil—the question of adding other manures is forced upon us for serious consideration, and that in the case of nitrogen this is best effected by the cultivation of leguminous crops inoculated with nitragin as placed on the market in its present perfected state and ploughed in as green manure, quite apart from the great improvement to the physical condition and increased vitality of the soil, and besides supplying the former with an abundance of green feed at the time of greatest need, either as pasture, ensilage, or hay."

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Maitland, November 11.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. Opie (chair), Bawden, Bentley, Heilemann, Hill, Leitz, Tossell, and Pitcher (Hon. Sec.).

NOXIOUS WEEDS.—An instructive discussion took place relative to the destruction of noxious weeds. Members generally thought the best way of eradicating them was grubbing out at a fair depth before they reached the seeding stage. Mr. Bawden pointed out that there was a tendency for the weeds to grow again unless they were cut off to a sufficient depth. It was important not to miss any when clearing a patch of soil.

WESTERN DISTRICT.

Colton, November 1.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Whitehead (chair), P. and M. Kenny, Hull, Shipard, and McBeath (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION:—

Farm Laborers' Blocks.—Members generally favored the idea of setting apart a piece of land, say one mile square, adjacent to water supply in each hundred to be cut into blocks for farm laborers.

Selling Cattle by Live Weight.—It was generally agreed that it would be of advantage to sell not only cattle by live weight, but other produce by weight, such as eggs, oranges, &c.

"HONOR TO WHOM HONOR IS DUE."—A pleasing tribute was paid at this meeting to the late Mr. John Shipard, who had for many years been a valued member of the Bureau, by placing in the hall an enlarged photograph, which had been presented by his son, Mr. F. Shipard.

Green Patch, November 6.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. Gore (chair), Chapman, Parker, Freeman, Merchant, and Whillas (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Members were unanimously of the opinion that when suitable weighbridges were available the proposed method of selling cattle by live weight would be a more just method than that in vogue at present.

Farm Laborers' Blocks.—The general opinion of the Branch was that to survey a number of blocks in one place for the purpose of providing holidays for workmen was unadvisable. However, a few blocks, scattered at intervals through the new hundreds, would be of great benefit.

MOTIVE POWER FOR FARM WORK.—Following on his paper on this subject, printed on page 425 of November, 1910, issue, the Hon. Secretary read the excellent paper on "Oil and Petrol Engines" printed below:—"The oil, petrol, and gas engines are all types of internal combustion engines, and, with the exception of the methods of fuel supply, work on the same general principles. The Otto, or four-stroke cycle, is the most common. In this type each working cycle of operations comprises two revolutions thus—(1) Suction stroke—The piston moves out, and the partial vacuum formed sucks in the explosive mixture through the open inlet valve, either held open by suitable mechanism or a poppet valve operated by the vacuum. (2) Compression stroke—The piston returning, compresses the mixture. As the combustion is not instantaneous the ignition should take place just before the end of the stroke, the exact lead being dependent upon the rate of combustion of the mixture and the piston speed, so as to give maximum pressure at dead centre in. (3) Power stroke—The explosion due to the combustion of the mixture causes a great increase in the pressure and temperature, and forces the piston out, the exploded gases expanding as the piston travels out. It is from this stroke that the power of the engine is derived, and the impetus then given to the flywheel carries the work on to the next power stroke. The exhaust valve is opened by suitable mechanism just before the end of the stroke so as to reduce the pressure to about atmospheric at dead centre out. (4) Exhaust stroke—The returning piston sweeps out the burnt gases through the open exhaust valve. The two-cycle engines work with an explosion every revolution. They are very simple in construction, having no valves, or at most one poppet valve on the inlet port. But compared with four-cycle engines they give poor fuel efficiency, require more cylinder-cooling, and are less reliable. It is not possible to so design the ports in a two-cycle engine as to enable it to take a full charge at all speeds. Liquid fuels when in an internal combustion engine require to be vaporised and mixed with a proper proportion of air to form an explosive mixture. Both petrol and kerosene are extracted from crude petroleum. The former is lighter and more volatile than the latter, and vaporises at ordinary temperatures, whereas kerosene requires heating. To form the best explosive mixture petrol requires from 14 to 17 times its weight of air, and kerosene about seven. With petrol the mixture is generally obtained in a carburettor. The petrol is either forced in a fine jet through the air, or the air is passed through or over the petrol. A valve is used to regulate the quantity of air admitted. There is always

supply of explosive mixture on hand, a portion of which is drawn into the cylinder on the suction stroke. Carburettors can be used for oil, in which case both the oil and air are heated generally by the exhaust. On oil engines vaporisers are more commonly used. The vaporiser is a chamber connected with the cylinder, either directly or through a timing valve. The oil is fed into it either by gravity, suction, or pump. In some types the air is mixed in the vaporiser, in others partly mixed, whilst in others all the mixing is done in the cylinder. Only sufficient oil is vaporised for each charge as required, and this is the fundamental difference between vaporisers and carburettors. To start an oil engine the oil has first to be heated by a pressure blow lamp. Whilst running the heat is maintained in some engines by a lamp, and in others by the waste heat from the cylinder. The lamps are a source of trouble, but a lamp engine will run on varying loads without the adjustments necessary for the economic running of lampless engines. The thermal efficiency of internal combustion engines increases with the compression. The maximum compression possible depends upon the flash point of the fuel used, the system of introducing the mixture to the cylinder, and, to a small extent, the piston speed. Fast running allows a higher compression. For slow-running petrol engines 85lbs. per square inch is about the limit, and for oil engines 95lbs., higher compression causing pre-ignition. In the Hornsby oil engine the mixing is mainly done in the cylinder, and a 200lbs. per square inch compression is used. The Diesel, the most efficient oil engine made, compresses pure air in the cylinder to a pressure of about 500lbs. per square inch, this causing a temperature of about 1,000° F. A high-pressure jet of crude oil is forced into the incandescent cylinder, which volatilises and ignites immediately it enters. These engines are complicated in construction, and are not made in farm sizes. Ignition in petrol engines is generally electric, and in oil engines is done either by a tube heated by a blow lamp, or by an automatic ignitor. Electric ignition is either the make or break or the jump-spark system. In the former two metallic points in the cylinder are made to open and close the circuit, which produces a very hot spark on the break of the circuit. The jump-spark ignition is more common and gives less trouble. In this a high voltage current is caused to spark between two metallic points, the sparking plug being placed in the cylinder. To produce the spark at the right moment the circuit must contain a make and break contact operated by the engine. The current is best obtained from a magneto driven by the engine. This is a machine like a dynamo for converting mechanical power into electric. It consists of fine copper wire coils revolving within the field of influence of a set of permanent magnets, in place of the electro-magnets of the dynamo. Electric ignition is sometimes used in oil engines, but is troublesome on account of the deposit formed on the sparking plug. In automatic ignition of oil engines, a portion of the residual waste heat from the cylinder is caused to concentrate to some portion of the vaporiser, and when this temperature is increased by the compression the ignition temperature is reached. In some types a timing valve is used to prevent pre-ignition, whilst some are adjusted so that the compression just raises the temperature to the required degree at the right moment. Some engines use a small water injection, which is varied according to the load. This also slightly increases thermal efficiency by decreasing heat losses through the cylinder walls. The heat of compression volatilises the water, which, on expansion, condenses again, giving back its heat to the expanding gases, thus slightly increasing their pressure. Where ignition tubes are used they are made either of a nickel alloy or of porcelain. Iron tubes will not stand the heat. The function of the governor on any prime mover is to maintain a nearly uniform speed under varying resistances and motive force. In oil and petrol engines the governor controls the speed either (a) by throttling the charge, (b) by cutting off the oil supply for one or more complete cycles, (c) by keeping the exhaust valve open during one or more cycles, (d) by interrupting the spark; (a) gives the best regularity, but is somewhat wasteful of fuel; (b), known as the hit or miss, is more economical of fuel, giving either a full explosion or none at all, but is less sensitive than (a), allowing, when well adjusted, a 5 per cent. variation—for farm work a 20 per cent. variation is not hurtful; (c) and (d) allow of less complicated mechanism than the others, but are not so economical with fuel as (a) or as sensitive as (b). As it is often necessary to change an engine's speed after it has been started, a governor that can be adjusted whilst the engine is running is to be preferred. Cylinder-cooling with the aid of air is only satisfactory with very small engines. It requires an enormous body of air to do the same amount of cooling as a small body of water. If a fan is used to supply the air current, the driving of the fan absorbs a fair percentage of the power, whereas with water-cooling the waste radiation heat can be used to cause the circulation. Circulating water should issue from the water jacket at a temperature of between 120° and 180° F. The water pipes must be arranged so that no air lock can occur. With the first-class makes of engines, if they are kept clean and the maker's

instructions faithfully carried out, there will be little trouble, especially if the user understands the working of his engine. Valves sometimes require readjustment owing to weakening of springs, wear of cams, or shifting of locknuts. Valve faces may become uneven and require regrinding. Poor lubricating oil may cause gummy valve stems and perhaps prevent the engine from starting. If for any reason the engine should be dismantled, it is advisable to see that the crank shaft and the cam shaft are so replaced as to be geared to the exact tooth. They are always distinctly marked. A leaky joint letting water into the cylinder may prevent the engine from working. The mixture must be neither too rich nor too poor, or it will not explode. If correct it burns with a deep-blue, nearly violet, flame, and the exhaust should be almost colorless. A black, smoky exhaust indicates too rich a mixture. Loud explosions indicate fuel waste. Late explosions may be due to the mixture being either too rich or too poor, or to poor ignition. The tube may be too cold; it should be kept at a cherry red heat. With auto-ignition the adjustments may be wrong. With electric ignition all connections require to be kept clean and close, and the sparking plug points clean and about $\frac{1}{16}$ in. apart. When the current is weak, bring the points closer. The spark will be smaller in the cylinder under compression than that shown when trying the plug outside. When starting a petrol engine, retard the spark over dead centre, advancing it again after the engine is going. There are several well-known and proved reliable makes on the market, and there is little to choose between them. A farmer cannot do better than purchase a make of engine with which his neighbors have gained experience, and which they have proved to be reliable and satisfactory. Simplicity of construction is of more importance to the farmer than fuel economy. Small oil and petrol engines running under conditions obtaining on the farm should not use more than $1\frac{1}{2}$ pts. of fuel per B.H.P. hour, this being over double the consumption of several engines at repeated tests made in Great Britain. For general work the oil engine is to be preferred, for it is less liable to go wrong than the petrol engine; also petrol is much dearer than kerosine. Losses with petrol, due to evaporation, are often considerable, and it is more dangerous to store than kerosine. However, the extra fuel cost of a petrol engine over kerosine would not amount to much on the average farm." In discussing the subject Mr. Freeman said the oil engine was much more suitable for the farmer than the petrol engine, as the former was much less troublesome, and was cheaper to run.

Koppio, November 8.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. F. Richardson (chair), Smith, Barrad, Thompson, R. Richardson, Brennand, T. R., G. B., and M. T. Gardner (Hon. Sec.), and three visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—In the absence of full particulars of the method to be adopted in connection with the proposal to sell cattle by live weight, the idea did not present itself to members as being practicable.

Farm Laborers' Blocks.—It was thought this proposal would encourage farm laborers with families to settle amongst the farming community, and the Branch therefore supported the idea.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. Gardner. Some fine Merino sheep were seen, and among them several prizetakers, including champion ram at recent Central Eyre's Peninsula show. A fine chaffcutting plant and a 6 H.P. Hornsby oil engine, working, and a large stone chaffed in course of erection were inspected. Passing on to the wheatfields, a crop of Federation was first seen. This was the seventh crop of wheat in succession without fallow. It looked well, and was expected to yield 14 bush. Next a crop of Cape oats intended for hay was passed through. Members thought that if reaped it would yield a better return, as it was rather short for a heavy hay crop. On a small flat alongside a creek were growing onions, potatoes, and several other kinds of vegetables. Members thought the onions a splendid crop, and that such crops could be grown profitably in this district. Opposite was seen a five-acre flat sown for hay with Marshall's No. 3 wheat. On this flat 40 bush. per acre of peas was harvested last year. This had been cropped eight years in succession, and apparently would yield a ton per acre. This crop did not show the benefit of the pea crop, which was thought an exception to the general rule. Winding up a gully was

seen another patch of Federation. Members thought this piece of 10 acres a very good crop, which would yield 25 bush. per acre. Alongside a fine plot of Dart's Imperial wheat was estimated to cut $1\frac{1}{2}$ tons of hay. Passing across fine natural grass on a stony strip of land another good patch of wheat on fallow land was seen. On a strip of this Mr. Gardner had only drilled and harrowed in the seed, and the rest had been scarified. On this one and a half acres a remarkable difference was seen, it being several bushels poorer crop, and all members thought that it would pay to give the fallow land a good working before seeding. Further on a swamp in a gully, which had been drained all round a fortnight previously, was seen, and what was then a quagmire was now firm land, which would be sown with onions and potatoes in the near future. On the top of a hill Mr. Gardner had been experimenting with field peas. Some were sown early, and some later, with the following quantities of super., viz., 15lbs., 40lbs., and 90lbs. per acre, and one plot without super. In every case the difference was noticed. The early sown with 90lbs. super. was by far the best. The most suitable time to sow was considered to be early in June, and it was preferable to sow thickly. Those sown late without super. were very poor. None of the pea crops were as good as last year. The best, a plot of 20 acres, was estimated to yield 20 bush. Inspection was then made of some late-sown wheat on poorly ploughed fallow. Some of this land had been ploughed back before seeding, and the rest scarified. The ploughed land gave the promise of a far greater return, whereas that portion which had been scarified was rather grassy. The majority of members preferred the skim plough for working fallow. On the return a demonstration in rabbit destruction was given by placing netting over holes and then throwing on earth. This method had been proved effectual in destroying both rabbits and burrows. Next was seen a small plot of wheat sown on August 5th. This looked very well, and was estimated to yield 14 bush. per acre. Further down was seen a plot of rape in a grass paddock. This had been grazed heavily, and after a three months' spell was now carrying a fine body of feed. Close to the homestead a strip of land had been topdressed with 50lbs. super. last May. This strip had been grazed more than other parts of the paddock, and consequently feed was much shorter yet greener. Close by on a piece of washed flat land was another vegetable garden of half an acre, on which was growing principally potatoes, which gave promise of a good crop. Many other varieties of summer vegetables were growing which would be benefited by rain later on. Near the stable half an acre of lucerne had just been mown, and was again making good growth, and should be valuable for mares and foals during the summer. Members were then entertained at tea, after which the business of the Branch was transacted and the host and hostess thanked for their hospitality.

Miltalie, November 4.

(Average annual rainfall, 14 $\frac{1}{2}$ in.)

PRESENT.—MESSRS. E. P. Smith (chair), W. G. Smith, Brooks, J. P., J. W., and E. Story, O. and G. Kobelt, Ramsey, Jacobs, Hier (Hon. Sec.), and two visitors.

MICE AND WEEVIL IN WHEAT.—This subject was dealt with in a paper by Mr. J. P. Story, in which he said that unless stacks of wheat were protected from mice these pests made holes in the bags and allowed the wheat to run out on to the damp ground where the weevil speedily germinated. He did not think the harvester was responsible for weevil, for the bottom of a stack was always found to be weevily first. Five or six feet sheets of galvanized iron let 3ft. into the ground around the stacks would prevent the inroads of mice.

Yadnarie, November 4.

PRESENT.—MESSRS. Schubert (chair), Kruger, Dreckow, F. W. and A. Jericho, Mowat, Brown, Parbes, Deer (Hon. Sec.), and four visitors.

FARM LABORERS' BLOCKS.—Following on the report of the Congress, delivered by the Branch's delegate, Mr. Jericho, discussion took place concerning the proposal to provide blocks of land in new country for farm laborers. After full consideration, members came to the conclusion that the advantages would not be sufficient for them to support the proposal.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, November 3.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Venning (chair), Gurner, Phillips, Hill, Fidge (Hon. Sec.), and five visitors.

HARVESTING.—The following paper was read by the Hon. Secretary:—"Hay should be left one or two days after cutting, according to the state of the weather. It should then be stooked in good round stooks of from 20 to 30 sheaves, and placed so as to keep the water out. After remaining in stooks for about 10 days it should be ready for carting. After being stacked it should have a straw-thatched roof to keep wet out and birds from damaging it. For the grain harvest I prefer the harvester to the stripper where the ground is clear, as it is quicker, and obviates the cleaning with the winnower of wheat, which operation takes a lot of time. Also, if heavy rain falls, a lot of wheat may be spoilt in the heaps which are made when the stripper is used. The time lost in cleaning wheat after the stripper put in preparing thoroughly a piece of ground for hay would more than make up for the loss of cocky chaff in the grain harvest."

Monarto South, November 3.

PRESENT.—Messrs. Braendler (chair), Thomas, J. B. and E. H. Frahn, G., R., and E. Hartmann, Paech, Schenschel, Hein, Altmann, Harper, Hill, (Hon. Sec.), and two visitors.

QUESTIONS FROM CONGRESS FOR OPINION.

Farm Laborers' Blocks.—After duly considering the proposal to set aside holdings for farm laborers in new hundreds, members expressed the view that the idea would not work out in accordance with the intentions of the movers, as it was thought that eventually the land would become the property of the farmers. Mr. A. Hartmann thought that if a farmer required the services of a man, and was able to employ him for the whole year, he should be able to put up a house and allow the man enough grass for the upkeep of one or two cows. The farmer would always then have his man at hand, whereas if the laborer had his own block it would take half his time in looking after it.

CLEARING AND WORKING SCRUB LANDS.—Mr. Harper contributed a paper on this subject, in which he said it was a mistake to roll, burn, and plough, and put in a crop on a piece of land as successive operations. Early-rolled scrub made fresh root growth, as the soil was holding a large amount of moisture, and when the sap came up the shoots grew again; consequently, in the following spring they were very frequently higher than the crop. When ploughing was done early the shoots generally got a good start and were troublesome. He recommended the following method of clearing:—First roll a firebreak around the block, clear it up, and plough. Roll the balance in the middle of November. Burn when the sap had gone, i.e., about April. Then leave the land as late as possible in spring, fallow, and leave rough until the following seedtime, when the land should be worked down and drilled as soon as possible. It should be left for two years after the first crop, when a good burn should be secured. The main point in favor of late handling of scrub was that with late rolling the mallee bled, and the heat of the sun dried it out. When the burning was late the shoots did not start again.

Parrakie, October 28.

PRESENT.—Messrs. Dayman (chair), Randall, Schmidt, Bottroff, Gravestocks, Brinkly, O. and C. Heinzel, Hammond, Lewis, Beckitz, Temby, Dayman, Threadgold Diener (Hon. Sec.), and three visitors.

QUESTIONS FROM CONGRESS FOR OPINION.

Selling Cattle by Live Weight.—After discussion a vote was taken, resulting in six in favor of this method of selling stock, and seven against it.

Farm Laborers' Blocks.—While members agreed that the suggested reservation of small holdings for blocks for farm laborers had much to recommend it, there was a general difference of opinion as to the best size to have the blocks,

Weighing Wheat in Bulk.—In a discussion on this subject the Chairman said the proposal should result in a considerable gain to the farmers. He advised them to provide weigh-bridges themselves on the co-operative principle. Mr. Schmidt said an appreciable saving of time should result, and disputes as to the number of bags on the load would be avoided. Mr. Hammond thought little time would be saved, and the cost of the bridges would be prohibitive. The Hon. Secretary thought farmers would not save so much as they imagined in the weight of their wheat, but a saving of time would be effected. Most of those present were in favor of giving the system a trial.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, November 7.

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. Chapman (chair), H., C., and J. Lewis, Ricks, Broadbent, H., T., and H. Jacobs, Stone, Tozer, Hicks, and Curnow (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Principally in view of the fact that there was no fixed ratio between the live and dressed weights of cattle, and the heavy live weight beast frequently weighed relatively lighter when dressed than a lighter live weight animal, the Branch could not see its way to support the proposal to sell cattle by live weight.

Farm Laborers' Blocks.—After duly considering this proposal members decided to give it their support, on condition that provision was made to prevent the land falling into the hands of farmers. When the holder of a block parted with it, the transfer should be to a non-landholder; otherwise the desired end would be defeated.

BEE-KEEPING: MANUFACTURE OF FOUNDATION COMB.—The Hon. Secretary dealt with this subject in the following paper:—"Foundation comb, as the name implies, is simply wax, machine-pressed into thin sheets, with the merest semblance of walls showing. It is really only the mid-rib of a piece of honeycomb. With the bar-frame system of bee-keeping it is essential that the bees should have a starter in each frame; otherwise the complete comb will not be all that is desired. I prefer to give a full sheet of foundation in each frame, instead of starters of, say, 2in. or 3in. in width. I am convinced that it pays to do so, for the simple reason that where bees are allowed to build at their own sweet will they will construct very many more drone cells than is necessary. This, of course, means an unwarranted drain on the space in the brood-nest, and consequently less honey-gatherers. By giving full sheets this trouble is largely overcome. Full sheets, however, mean more expense, especially where the comb has to be purchased. If one has 50 or 100 colonies it pays well to purchase a foundation-comb machine and make the comb. The process is not a difficult one, and after a little practice one becomes fairly adept. First of all it is necessary to procure a supply of rough wax, boil it, or rather melt it down, and strain through a piece of fine bagging. See that it is quite free from dirt. Now procure your dipping-boards. These can be made as follows:—Take the ends from a brandy case; especially choose those where the heart of the tree runs down the middle. Plane very smoothly on both sides, and cut to 12in. in length and 9in. in width. Now fasten a wire handle to one end. This is done by boring a hole in the centre of the board about ¼in. from the top, twisting a piece of wire into a loop, and fastening. The dipping-boards being ready, and it is necessary to have several of them, now attend to the dipping-tank. You will find a couple of kerosine tins answer the purpose. Fill the first tin with your wax to within about 2in. from the top. A drop of water in the bottom will not hurt. See that the whole of the wax is evenly melted. Mix a basin of starch, as is used for stiffening linen, &c., and with a clean paint brush apply a thin coat of starch to either side of the board. Next take the latter by the handle and plunge full depth into the molten wax; count three, and withdraw; allow to slightly cool, and repeat the operation. It may be necessary to dip several times, but practice only will teach you this. When you have dipped your set of, say, four or five boards you will

notice that the sheets of wax on either side of the board first treated have begun to peel off. Finish this with a knife, care being taken not to damage the sheet. The waste trimmings from the edges of the boards should be placed in the second kerosine tin, and kept melted for future use. It is advisable to brush over each board with the starch after each removal of wax. On the completion of the dipping process, and whilst the sheets of wax are still at a nice temperature, it is just as well to run them through the foundation mill or press. Should the sheets become hard and cold, bring them back to the right temperature in a tin of warm water. It is necessary for the wax to be soft enough to bend readily. It is advisable to pour some hot water on to the rollers of the mill before starting, so as to remove the chill. Now fill the trough with starch, and see that the rollers are well lubricated with same. If all goes well, as it should, a few minutes will suffice to do a large number of sheets. When the pressing is complete it is advisable to at once cut the sheets to the desired length and width. It is best to cut them $\frac{1}{2}$ in. clear of the ends of the frame, and $\frac{1}{2}$ in. in width. This margin will prevent the comb bulging when drawn out by the bees. After squaring, lay them on a flat surface and weight down, so as to get nice straight, flat, even sheets. Sheets of this description are much easier put in the bar-frames. The whole process of comb-making is simple and easy, and inexpensive, the initial outlay in the comb mill being the only expense. Very fine foundation comb is made by means of a flat press, but I have had no experience with it. There are other fluxes that can be used instead of starch, but the latter is very good."

Forest Range, October 5.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. Green (chair), Pollard, Rowley, McLaren, Sass, Waters, Schultz, Green, Collins, and Monks (Hon. Sec.).

WOOLLY APHIS.—A discussion took place regarding the best means of clearing apple trees of woolly aphis. Some members had tried spreading salt in the soil around the roots of the trees, whilst others had tried washing soda. So far the effect could not be ascertained.

APPLE-PACKING SHED.—Mr. C. Pollard read the following paper on this subject:—"The average orchardist does not pay enough attention to his accommodation for packing export apples. The lack of facilities in some orchards is deplorable. Some people try to pack apples in sheds altogether unsuited for the purpose, the sheds being either badly lighted, draughty, or having uneven earthen floors. I have seen people burning a lamp in the middle of the day to see what they were doing; no wonder a few bad apples got in the case. The packing paper, being very light, blows about with the slightest draught, and nothing is more annoying or unsightly than to have the shed littered with paper. When there is only an earthen floor the cases get very dirty, and often it is almost impossible to distinguish the brands on them. Inconvenience is also caused through the shed being altogether too small to enable the work to be expeditiously carried out. It is necessary to have plenty of room when packing. A shed should be about 25ft. long and 12ft. wide, built with stone or what is locally called "pisé," or something that can be whitewashed inside, so as to help to check the codlin moth. Galvanized-iron for building is very much in favor at present, but in my opinion it allows too great a variation of temperature for an apple shed. I have been in a galvanized-iron shed when the heat has been almost unbearable. This would have a bad effect upon apples, especially if picked before they were thoroughly matured. A wooden building would offer too much harbor for vermin. The shed should have high walls, to keep it as cool as possible. For a floor I would suggest cement or flooring boards put down solidly. A clean floor is needed to keep the case clean. A nice clean case will help to sell the fruit at the other end. Good lighting is essential in order that any defects in the apples can easily be seen. Some growers have a very bad habit of taking codlin moth infected fruit into the shed. This should be kept as far from the shed as possible, as there is a risk of the grub getting into the good apples." A profitable discussion followed the reading of the paper. Mr. Waters said buildings of pisé made good packing sheds, and they were not expensive. Mr. J. Green thought stone or pisé would be too expensive. Iron and wood sheds made suitable accommodation for packing. He had put apples 4ft. deep in the bunks, and they kept well. Mr. McLaren mentioned that with a packing shed only 25ft. by 12ft. it would be necessary to have another shed for cases. Mr. Schütz

had seen apples stored in an orchard with a covering of iron, and with space for ventilation. They kept well.

Gumeracha.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Porter (chair), Cornish, Monfries, W. B. and J. B. Randell, Moore, Hanna, Norsworthy, and Lee (Hon. Sec.).

SHEEP v. COWS ON SMALL HOLDINGS.—Mr. D. Hanna read a paper as follows:—

"With cows or sheep success or failure depends upon the management, the class of stock kept, the value of the food, and the value of the product. My own experience with sheep and cows will enable me to give a fairly reliable estimate of the income that may be derived from each. As an illustration, I will assume that an experiment is to be carried out on two improved farms, each containing 300 acres, with the necessary buildings and plant. The rental value of each is 8s. per acre, and the carrying capacity 300 sheep or 50 cows. I would commence operations on No. 1 farm by purchasing from a reliable breeder in the Hills district 300 full-mouthed Merino ewes, well woolled, and with large frames. I would mate with these pure-bred Lincoln rams, costing £2 2s. each, and so arrange that the lambs should be dropped in April or May. The best ewe lambs should be kept, and when old enough mated with a Southdown ram. The progeny will give one of the best export lambs, and the mother will for a number of years out a valuable fleece of wool. All the wether and rejected ewe lambs and a fair proportion of the worst Merino ewes may be sold during the first year, thus making room for the cross-bred ewe lambs retained for breeding purposes, and from which you will eventually obtain your export lambs. At the end of two years the whole, or at any rate a large proportion, of the Merino ewes will have been disposed of, and in their place you should have 300 Lincoln-Merino ewes. These ewes are splendid mothers, fatten quickly, are very quiet, and are not easily disturbed by dogs or persons trespassing on your land; consequently trample down very little grass compared with the Merino. Farm No. 2 should, in favorable seasons, carry 50 cows. In the purchase and selection of these it will be found very difficult to obtain more than a good average dairy herd. These should be purchased from reliable dairymen in preference to buying at auction sales. The necessary bulls from one of the best pure-bred milking strains (preferably Ayrshire-Jersey or Shorthorn) should be used on these cows. Select heifer calves from the best of these, and gradually sell off the worst cows so as to avoid overstocking. Do not mate the bull with his own progeny; rather introduce a fresh strain of pure blood. The following figures will give a fair idea of the gross income and expenditure and the net income in both instances:—

Cows.—Yield per cow, 150lbs. butter at 11d., £6 17s. 6d.; skim milk, 335galls. at ½d., 13s. 11d.; gross income per cow, £7 11s. 5d. Cost of production per cow—Rent of six acres grass at 8s. per acre, £2 8s.; milking, 365galls. at 1d. per gallon, £1 10s. 5d.; making, cartage, and commission on butter at 2d. per pound, £1 5s.; separating and other expenses, 10s. Total expenses, £5 13s. 5d. Net profit per cow, £1 18s., or for 50 cows, £95 0s. 10d.

Sheep.—Income—Wool from 300 ewes, 2,400lbs. at 9d. per pound, £90; wool from 270 lambs at 6d. per pound, £20 5s.; value of 270 lambs at 10s. per head, £135. Total income, £245 5s. Expenses—Shearing 470 ewes and lambs at 3d. per head, £7 2s. 6d.; rent 300 ewes at 8s. per head, £120; bales, sacks, cartage, and commission on 3,210lbs. wool at ½d., £6 13s. 9d.; other expenses, 6d. per head, £14 5s. Total expenses, £148 1s. 3d., showing a net profit of £97 3s. 9d. This shows an extra profit of £2 2s. 11d. in favor of sheep. I have not taken into consideration the cultivation and feeding of cereal, root, or fodder crops in either case, but the estimate is based upon production from the natural grasses only. The labor required to produce a net income of £97 3s. 9d. from the sheep is at least 40 per cent. less than that expended on the cows." In the discussion which followed the reading of the paper Mr. Cornish pointed out that it was necessary to thoroughly understand sheep in order to make them pay. He favored cows for small holdings, but if he had a larger area he would keep sheep. He did not favor hand-feeding. Mr. Monfries would keep sheep if he had 1,000 acres, but with smaller holdings the cows paid best. Mr. Randell pointed out that if cows were kept it was absolutely essential that they should be of a good milking strain. He believed in ensilage. If milking machines were used, and 6d. per gallon was received for the milk, cows would pay. Mr. Norsworthy thought it impossible to fatten lambs on natural grass. By breeding good cows they should be able to secure 800galls. of milk from them, instead of 400galls., which was the average at present. Mr. Moore said the figures given in the paper were too high. Mr. Porter thought that land worth 8s. per acre should keep two sheep. He favored the Border Leicester ram for crossing.

Hartley, November 14.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), O. Wundersitz, Clark, Hudd, Symonds, Brook, Phillips, Stanton, Leverington, Birmingham (Hon. Sec.), and four visitors.

INSPECTION OF CROPS.—A tour of inspection of the crops of various members was made. Owing to the dryness of the season it was found that, except where the ground had been fallowed, they were not looking so well as usual. Mr. Clark had a good crop of hay on fallowed land; and a crop of King's Early, the property of Mr. B. Wundersitz, was looking splendid. This gentleman had also a good crop of Yandilla King, which, like the King's Early, was sown on fallowed land. The evening was enjoyably spent with social games, &c.

Kanmantoo, September 7.

(Average annual rainfall, 17in.)

ANNUAL SOCIAL.—The annual meeting of this Branch was held on September 7th, and took the form of a social evening. A commendable innovation, in the shape of a paper for ladies, was read by Mrs. W. G. Miles, as follows:—"Members of the Agricultural Bureau often get useful hints on farming from meeting together, discussing the working and management of farms, new modes—tried and untried—so why should not the wives, mothers, and sisters of members meet together once or twice a year to discuss household arrangements and receive mutual benefit? More especially would this be beneficial in times when domestic help is so difficult to obtain. It surely behoves us to find out the easiest and best methods of cooking, jam-making, preserving and drying fruit; also the best kinds of foods to cook, and how to pack the same, for our men folk, who so often have to leave the comforts of home and camp out with little or no means of looking after the food sent out. If in the future our young folk must do the work in their homes without help, we (who have had possibly more work, but more hands with which to do it) should assist in order that their labor may be lessened as much as possible. Then, again, if they are to have no leisure to read even so much as the paper, how can they know what is going on in the world; or what pleasure can there be in life if, when night comes, wives, mothers, and sisters are too tired to do anything but go to bed. Now, if we could (by a little judicious chatter) help each other to overcome the mistakes we so often make in our household work, through not understanding the best and most simple way of doing it, a few hours would be well spent, to say nothing of an enjoyable cup of tea or coffee, and tastes of cake, jam, or any other dainties made by some tried and proved recipe by one or other of the housewives."

Longwood, November 4.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes, (chair) W. and J. Nicholls, Roebuck, Vogel, Blakley Furniss, Glyde, Oinn, Pritchard, Coles (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. J. Roebuck. Attention was drawn to some Rome Beauty apples, which had been planted alternately with Jonathans in 20-ft. rows in sandy, gravelly soil. After making a good start and growing well for about three years they died off to the ground, grew again, and after the space of two or three years died off again. When the orchard had been inspected last year the trouble was attributed to collar rot or sand scorch, but members are now unable to diagnose the cause.

LIME FOR THE SOIL.—Mr. Roebuck was conducting some interesting experiments with the application of lime and bonedust to wheat crops. A plot sown with an application of lime only looked best. Members expressed the view that on light sandy soil lime would not show a very marked effect. Wheat, as a rule, did not do well in this locality.

SHOTHOLE FUNGUS.—For peach trees affected with shothole fungus spraying in April with Bordeaux mixture was recommended.

MacGillivray, November 6.

PRESENT.—Messrs. Wheaton (chair), Ayris, A. Stirling (sen. and jun.), Petras, Wiadrowski, Nicholls, Burgess, and Williams (Hon. Sec.).

HOMESTEAD MEETING.—The meeting was held at the homestead of the Chairman. A paddock of 50 acres, being fed off preparatory to fallowing next year, was inspected. The wisdom of feeding off early was demonstrated by a crop of Walker's Early and Gallant's Hybrid wheat, which was found to be dirty with oat grass. The seed had been sown thinly, and on land on which grass had been allowed to seed before it was fed off, and the ploughing was done too late to permit of effective cultivation. Gallant's Hybrid was found to do well in stiff soils. Thirty-six acres of oats and 50 acres of Federation wheat looked very well. Eighteen acres of Yandilla King on fallow appeared to have been sown too early. In patches the grass had completely overcome the wheat. Twenty-five acres of Combination wheat was doing well and gave the impression that the variety was suited to the conditions of Kangaroo Island. Of the total area, seven acres had been fallowed. The fallowed portion was estimated to return 24bush. to the acre, and that portion which had not been fallowed 12bush. Plots of 10 acres each of maize and sorghum were inspected. The plants were just showing above ground. It was pointed out that in planting these and similar crops it was necessary to have the drills evenly spaced and set wide enough apart to permit of after cultivation with a horse hoe. Perennial rye and Timothy grasses, sown last autumn, looked healthy. The best time for planting grasses was during March and April; failing this they could be left until August. Admiration was expressed for the orchard, kitchen garden, and live stock, and the general up-to-date appearance of the farm was commented upon.

Meadows, November 7.

(Average annual rainfall, 34½in.)

PRESENT.—Messrs. Elix (chair), Catt, Brooks, Nicolle, J. and G. R. Stone, Kleeman, Nottage, Ellis, and Bartrum (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Considerable discussion took place in regard to this proposal. The Chairman said the seller of cattle generally overestimated the weight. The proposed system would be fairer to both buyer and seller. Mr. Brooks said the cost of erection of suitable weighbridges at saleyards would be prohibitive. Members generally were of opinion that the present system of selling cattle was satisfactory.

Farm Laborers' Blocks.—Whilst the Chairman thought the proposal a good one, Mr. G. R. Stone pointed out that if the laborer had an area of 100 acres of his own to attend, he would be of very little assistance to farmers in the locality during the busy parts of the year. Mr. Catt thought that the area proposed was too large, but Mr. Brooks contended that the result would be to encourage the laborer to make a home of his own. The majority of members approved of the idea.

Meningie, November 4.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Hiscock (chair), Mincham, Ayers, Hill, Coad, Tregilgas (Hon. Sec.), and two visitors.

QUESTIONS FROM CONGRESS FOR OPINION:—

Selling Cattle by Live Weight.—Members were not in favor of this method of selling cattle.

Farm Laborers' Blocks.—This Branch was in favor of providing blocks not less than 50 and not more than 100 acres in area for farm laborers.

Morphett Vale, November 21.

(Average annual rainfall, 22½in.)

PRESENT.—Messrs. A. C. Pocock (chair), Sprigg, Christie, Goldsmith, Connole, Higgins, Perry, Gilbertson, and Hunt (Hon. Sec.).

EFFECT OF EARTHING-UP WHEAT.—Mr. Christie tabled some heads of Federation wheat. One sample was almost three times as large as the other. Mr. Christie stated that the large heads grew on the edge of the crop where the wheat had been earthed-up by the drifting sand.

A GOOD HAY CROP.—Mr. Christie also tabled a sample of hay (mixed wheat and oats) of splendid quality which had grown to a height of over 6ft. Cape barley and rye were

also exhibited. The former was of splendid growth, as many as 85 grains being found in one head. It was grown amongst wheat on sandy soil.

SICKLE versus PLAIN BINDER-KNIFE.—In reply to a question as to which was the better for hay-cutting, the sickle or plain knife, members expressed divergent views; but most members agreed that if the crop was dirty or green, the latter was better as it did not gum up.

TOPPING GUM TREES.—Mr. Christie was advised that the best time to top gum trees was about the first week in September.

Mount Pleasant, November 11.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. Giles (chair), Miller, Phillis, Vigar, Tapscott, Royal, and Maxwell (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Following a discussion on this subject, a resolution that the Branch disapproved of the principle of selling cattle by live weight was passed.

Farm Laborers' Blocks.—After due consideration members expressed an opinion in favor of the proposal to survey small holdings for farm laborers in new hundreds.

THE SEASON.—It was reported that, owing to an insufficiency of rain, the crops had gone back very much during the past few weeks; but stock in the district were doing well.

Port Elliot, October 21.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. Welch (chair), Brown, Green, McLeod, and Hargreaves.

CLOVERS.—Members thought Egyptian clover would be a good crop to grow for green manuring. The opinion was expressed that Subterranean clover grown on sandy soil was bad for horses. Members generally considered it good for horses, dairy cattle, or sheep.

SLUGS.—Superphosphate sprinkled around young plants was advocated as an effectual means of destroying slugs.

PEACHES.—Members had found that if peach trees were cut down to within a few feet of the ground a new growth would result and a more vigorous tree be the outcome.

FRUIT-GROWING.—The following paper was contributed by Mr. W. E. Hargreaves:—
 "Seventeen years ago I asked a few orchardists if fruit-growing paid. The answer I got from most of them was, 'There is nothing in it.' Nevertheless, I planted a few acres and found my advisers were wrong. Ask the same question to-day and you will get the same reply, 'Plenty of work, but poor pay.' Why are there so many failures? There are many reasons. First, mistakes are often made when planting. Varieties totally unsuited to the district are planted, which, after many years' working, have either to be cut down and grafted or grubbed up and replanted. In nearly all fruit-growing districts the soil varies more or less every few chains. Go into any orchard and you will find trees thriving in one spot and a few yards away the same variety will be stunted and unprofitable. One variety may do well on a slope or rise and the same variety is absolutely worthless in the gully or low flat. When planting an orchard closely observe other orchards in the district, and note the varieties that grow and bear well, and study the soil they are growing in. A few hours spent in observation may mean the difference between success or failure. If we wish to avoid failures we must treat every tree individually and make every tree a money-maker. Cut out every unprofitable tree and plant in its place a money-maker. A progressive dairy-farmer weeds out the loafer, and the gardener must do the same. Nearly every orchardist has unprofitable trees; yet how many growers recognise the fact and try to remedy the evil. For farming purposes the general demand for land continues unabated, stimulated doubtless by continuous good seasons and good prices for produce. Our farmers and their sons go away to new places to make a new home in the mallee country, and they leave thousands of acres of land as good, if not better, within 40 or 50 miles of Adelaide. I am alluding to the country from the top of the hills near Port Elliot right through to Myponga, and from Hindmarsh Valley to the Meadows; in fact, any of the heavy timbered, either gum or stringybark, land is good fruit country, and cannot be beaten in South Australia. We are not doing our best to

utilise this large area of timbered land. Some of it is poor, but there are thousands of acres which would grow fine fruit. My opinion is that we have not done half as much as we could to make our climate and isolated country answer the purpose for which it is adapted. Someone will say 'If we grow more fruit we shall glut the local market.' This is true, but we must not grow too much soft fruit. We must grow for the oversea markets. We can grow and sell apples and pears at 2s. 6d. per case net and then do better than the farmer with wheat at 3s. per bushel. Most of our local shopkeepers get their dried pears, apricots, and peaches from Renmark and similar places. We should not allow other places to come in and take away the cash when we can grow and dry all these fruits as well as they, and then have to pay more for dried fruit which has been carted a long distance on boat or train. In McLaren Vale new buildings are going up, and the timber and scrub are giving place to the vine and fruit trees, giving labor in cultivating the soil, grape-picking, wine-making, pruning, currant-drying, &c. A few years ago you could have bought land there at a few pounds per acre which to-day would bring £12 to £15 per acre. What vine-growing has done for McLaren Vale fruit-growing can do for us. Do we find the winemaker trusting to the local market? I think not. If they did, their cry would be like that of a number of our would-be fruitgrowers—'You will glut the local market.' We must do as they do—send our fruit to oversea market. It is to such men as these that we are indebted for finding markets for our produce. Apples and pears have nothing to live down as regards a market. Our fruit has a good name in the old country and the market is open. It is reasonable to suppose that with increased export prices will rule lower, but it is undoubtedly my opinion that we have a big advantage over some of the States in having a climate adapted to the growing of the apple and the pear. The question of price is one depending to a large extent on the care and skill exercised by the grower in grading and packing the most suitable varieties. Well-graded and prime fruit will always command a fair price. Fruit-growing is of considerable interest to the landowner. It means larger returns and an increase in the value of land suitable for fruit-growing. It means trade, and trade means money. It is a pleasant occupation. 'There is one drawback to fruit culture in timbered land. You have to do a lot of work and wait some years without any return. The community has not realised the importance and value of the fruit industry in the past, but things have taken a change and many of our public men have opened their eyes to this important industry. It is essential to pick a sheltered spot for an orchard, because a lot depends on the site and shelter. Plant such varieties as Cox's Orange Pippin, Cleopatra, Jonathan, Rome Beauty, King David, Dumelow Seedling, and a few others which suit your land. All these varieties grow and bear well on our slaty and clay subsoil in the hills with a fair rainfall. In the past some were afraid to plant because of the codlin moth. The codlin need not worry anyone as long as he uses arsenate of lead. You must give the closest attention to all the details of a thorough spraying. A good spray pump and arsenate of lead will keep the codlin moth in check. One thorough good spraying with 1lb. of arsenate of lead to 40galls. of water a few days after the petals fall will do more good than three later sprayings. I find stable or yard manure the best for several reasons. It seems to meet nearly all the requirements of the fruit tree and it goes back to the soil, which is full of vegetable matter, and keeps the soil loose. We shall notice the land where we put stable manure is full of worms, which are eating and passing the earth through their bodies and improving it. I find peat good for trees; in fact, it is next in value to stable manure on stiff soil. Seaweed makes good manure for trees if the manure from the stable is tipped on it. After a few weeks mix and cart it on to the orchard in August or early in September, and plough it down 4in. or 5in. deep. All manure should be ploughed or dug down. If left on top it draws the roots to the surface and when the hot weather comes the roots suffer. So far as commercial manures are concerned, I find bonedust and bone super. best. Too much manure at a time only causes wood growth. Small dressings repeated every year pay best. At the same time we must not starve our trees. A wheelbarrow full of stable manure to every tree, or about 2½lbs. bonedust or bone super. (roughly speaking about 3cwt. per acre), gives best results. Where the stable manure is put in one year bonedust or super. should be applied the next, and vice versa. Fowl manure is very good if not put on too thickly. One bag to two large trees is quite sufficient. Wood ashes are a great help to trees, especially to stone fruit. I have picked as many as five cases, or 40galls., of plums from a nine-year-old plum tree, which had no other manure than ashes. It pays to burn all the cuttings in a fire-cart in the same way as the vine-growers do. Then the ashes are not lost, and codlin or other insects that may be on the cuttings are destroyed. A fruit tree may bear for 50 or 60 years. It stands to reason, therefore, that it will soon make the spot it stands in poor if it is not fed. Ten acres of trees manured and cultivated will bring in more profit than 20 acres left uncultivated and

not manured. If we want success we must not think that because we manure our trees we can let the plough and horse-hoe stand idle. No amount of manure will make up for lack of cultivation."

Port Elliot, November 18.

(Average annual rainfall, 20½ in.)

PRESENT.—Messrs. Welch (chair), Brown, Chibnall, McLeod, Barton, Vince, Green, W. E. and W. H. Hargreaves (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Farm Laborers' Blocks.—After consideration of this subject, members agreed that they would support the proposal to survey small blocks in new hundreds for the purpose of providing holdings for farm laborers. It was thought that the rainfall, soil, and climate should be determining factors when considering the size of the blocks.

Weighing Wheat in Bulk.—This proposal commended itself to members; but it was considered necessary to test the weighbridges periodically, as they were very liable to get out of repair.

Strathalbyn, November 10.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. Fischer (chair), Gardner, Poole, Collett, Knight, Traeger, Heinjus, Cockburn, and Rankine (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—The present method of disposing of cattle was considered the most satisfactory. The grade and quality of a beast, as well as the weight, had to be taken into account by the buyer, and the proposed method was not considered workable.

Farm Laborers' Blocks.—Members thought the idea of surveying small blocks for farm laborers a good one so far as new hundreds were concerned, and decided to support it.

Uraidla and Summertown, November 6.

(Average annual rainfall, 42½ in.)

PRESENT.—Messrs. Hawke (chair), Kessell, Rowe, Richardson, Curtis, Day, H. and W. Dyer, Prentice, Hart, Cobbleddick, Johnson, Moulds, and Snell (Hon. Sec.).

FARM LABORERS' BLOCKS.—Some discussion took place respecting this question deferred from Congress. Members were in favor of the suggestion to provide blocks of land for farm laborers.

Woodside, November 1.

(Average annual rainfall, 31 in.)

PRESENT.—Messrs. Rollbusch (chair), Fowler, Keddie, Lauterbach, Baldcock, Disher, Newman, Keen, King, and Hughes (Hon. Sec.).

DAIRYING.—The following paper on this subject was contributed by Mr. J. Lauterbach:—"Dairying in South Australia during the last 20 years has made wonderful progress, and has proved itself to be one of the most remunerative branches of agriculture. One acquainted with the conditions obtaining in this State, the vast areas of land suitable for grazing cows for milk production, and the mildness of our winters, must admit that the possibilities of South Australia in this direction are enormous. To assist the industry all interested should work together to get the best result from their cows. The need for care on the part of the suppliers in handling milk and cream is increasing. The production of good butter and cheese depends entirely on cleanliness on all sides, and the judicious feeding of the dairy cow. In separating milk every precaution should be taken to have the working parts of the machine perfectly clean. It should be taken to pieces after each separating, and the bowl and its accessories thoroughly scalded. Put the parts together immediately before separation. Cream should always be cooled before it is mixed. 'Colostrum,' or 'beasting' is the name applied to the milk secreted by the cow immediately before and sometimes after calving. Milk is not fit for butter or cheese making until the lapse of from four to six days, and in some cases a longer period after calving. One of the most important things in milking is to strip the cow dry. If this is done she will keep in milk longer, and consequently the return will be much higher. The first milk

drawn from a cow does not contain 1 per cent. of butter-fat. The last half pint contains as much as 11 per cent. The best cow the farmer can keep is a cross between the Jersey and the Shorthorn. This gives size of beast, and quantity and quality of milk. Very often loss is caused through the separator not being run at the proper speed. Where milk and cream are kept plenty of fresh air is required; and on no account should meat or vegetables be kept in close proximity. During some months of the year considerable trouble is caused through the cows being fed on weeds which impart an objectionable flavor to the butter. On this account kale should be excluded from the ration of dairy cows." In the discussion which followed members were of opinion that many farmers failed to give their cows a sufficiently of nourishing feed during the autumn and early winter.

SOUTH-EAST DISTRICT.

Keith, October 7.

PRESENT.—Messrs. Lambert (chair), Pearson, C. and J. Godlee, Fulwood, Dall, Hutchings, Leishman, Morcombe, and Lock (Hon. Sec.).

HARVESTER v. STRIPPER.—A good discussion on this subject followed the reading of a paper by Mr. Lambert. Members agreed that for a comparatively small crop the harvester was better, as it required less laborers. The stripper and motor winnower were thought the best machines for harvesting a large area of crop.

Millicent, October 31.

(Average annual rainfall, 28½ in.)

PRESENT.—Messrs. G. Mutton (chair), Oberlander, Holzgreffe, Hart, Mullins, Day (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. J. J. Mullins. The Government experimental plot which had been established about six years ago on fern land, the property of Mr. Mullins, was the centre of considerable interest. In an eight-acre enclosure was a crop of Partridge peas, sown in the middle of May, which had just commenced to flower. The crop was divided into six lands of one acre each, different manures being used in each plot. The quantity of seed used was 1½ bush. to the acre. The soil was poor-looking, mostly sand, and very patchy. Gypsum appeared to be giving the best results, but the land on which it was used was the best patch in the plot, and had been frequently manured. The manures used were as follows:—No. 1, 2cwts. basic slag; No. 2, 2cwts. mineral super., mixed with wood ashes; No. 3, 2cwts. mineral super.; No. 4, no manure; No. 5, 5cwts. lime; No. 6, 5cwts. gypsum. The use of wood ashes had little effect. Where no manure was used there was scarcely any crop. After inspecting the peas, the party visited a second enclosure, containing six or seven acres, in which six plots were sown with Algerian oats. The manures used here were—No. 1, 2cwts. mineral super.; No. 2, 1½cwts.; No. 3, 1cwts.; No. 4, no manure; No. 5, 1½cwts. mineral super. and wood ashes; No. 6, 1½cwts. basic slag. The crop was young, but looked healthy, and the results would be watched with interest. Some nice malting barley was growing where a large crop of potatoes had been grown last year.

DESTROYING SLUGS.—A discussion took place on this subject. The use of gypsum, soot, lime, and salt was recommended. All rubbish should be carefully cleared from the garden, and no harbor should be left for the pest. Lime dust, sprinkled about on a windy evening when the slugs were to be seen, had given good results. Salt would keep them away from the plants, but it should be used carefully to avoid injury to the vegetation.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—After duly considering the *pros* and *cons* of this subject members considered the proposal to sell cattle by live weight the fairest method.

Farm Laborers' Blocks.—It was decided to give the proposal to set aside blocks in new country for farm laborers the support of the Branch, as members anticipated that the result would be of benefit to all concerned.

POTATOES.—A discussion on the moulding of potatoes was initiated by Mr. Day. The practice was advisable on the flats, but no more than was necessary to keep the tubers covered should be done.

Mount Gambier, October 14.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Wedd (chair), Ellis, Buck, Keegan, Watson, Smith, Pick, Ruwoldt, Pritchard, Botterill, Bodey, Lines, Sassanowsky, Kennedy, Kilsby, Collins (Hon. Sec.)

TICK AND LICE IN SHEEP.—Mr. Botterill delivered an address on this subject. Thirty years ago, he said, he went out to a station as a young man, and such a thing as dipping sheep was not thought of. It was quite a common thing to see sheep and lambs covered with ticks. About 1882 the station had a good stud flock of sheep, one of the best in the district, and the idea struck the owner that it might be worth while trying to get rid of the ticks. He was stimulated to do this by the fact that Hood's Specific for ticks was being advertised. He had no dip, of course, in which to dip the sheep, and had to fall back on a bush contrivance. A big cast-iron boiler, with a capacity of 40galls. to 50galls., was used. As they had a limited supply of water they resolved to waste as little as possible, so a drainer was made of wool and bullock hide. It was then necessary for two men to handle the sheep. One held the front legs and the head, and one held the hind legs. They dipped the sheep in the boiler on its back. There were 300 stud sheep, and it took them three days to complete the work. Since then different designs of dips had been used; one of them, with which they were best acquainted, was that into which the sheep were tipped from a tip-table. The one he considered more up to date was that in which the sheep simply walked down a ramp, swam through the dip, and walked up an incline on the opposite side. This was the style generally adopted now. Mr. T. H. Williams (Chief Inspector of Stock) said that in this State there were, roughly, a million sheep infested with lice every year. That million plucked their wool out and rubbed it out against fences, &c., and the loss, taken at 2d. per head, worked out a total of £100,000 to £120,000 a year. That was a large sum for woolgrowers to lose. With regard to tick there was another £100,000 lost in like manner, so that South Australia lost something like £300,000 a year through owners not thoroughly dipping their flocks. Even if they wrote it down by one-third it was a large amount. If the sheep were properly dipped they could get rid of ticks and lice without any trouble. Mr. Williams advocated two dips for lice—one immediately after shearing and another two months later on. He could not agree with this. If they were to dip two months after shearing why knock the sheep about and dip them twice? Why not make one dipping do? There was no doubt that sheep particularly crossbreds, did not derive as much benefit from being dipped immediately off the shears as they would if the dipping was done later. On nice clean runs, if the sheep were well looked after, they would not get tick; but sheep kept in damper country and on roads that were travelled over by dirty flocks should not be dipped until they had a certain amount of wool on. Crossbreds should be dipped later than off the shears. Merinos usually had a little wool left on, and in their case it did not matter so much. In Victoria they had an Act which provided that each owner of sheep had to obtain a certificate that his sheep had been properly dipped. If he had not a certificate he was liable to prosecution and fine. Mr. Wedd said in Victoria sheepowners had to send to the Chief Inspector of Stock a declaration that their sheep had been properly dipped. Then they received a certificate for their stock, without which they were not permitted to travel them on the roads under penalty of a fine. Mr. G. Bodey said they had tick and lice in the South-East to-day, and he thought it was important there should be some law to compel people to deal with them. He had 400 weaners that came up from the coast, and the wool was falling off them through tick and lice. He thought it should be compulsory for every man to secure a certificate that his sheep had been properly dipped. Mr. T. C. Ellis said that in one State at the end of a certain month every man had to send in a return showing that the sheep were dipped, how many were dipped, and in what dip. Then the inspector visited the farms or stations where dipping was not done and inspected the sheep. Lice was a terribly hard thing to get rid of. He had found that two dippings were necessary in some cases. He agreed with Mr. Botterill that if the sheep were dipped properly once in the year they would get rid of lice. Two months after shearing was the best time. Mr. H. Kennedy thought there should be some provision made for people with small flocks to dip their sheep. The Government should have public dips at different places, or a central dip that farmers could avail themselves of. At present those having dips of their own were asked by neighbors to allow them to dip their sheep in them, and he thought carelessness

in this respect was a cause of a good deal of the spread of tick and lice pest. Mr. H. Pick thought one dipping, done properly, was sufficient. Very often people were inclined to slum the job. There were many flocks in the district not dipped, or only half-dipped. The present law was strict enough if it was only enforced. Mr. P. Pritchard had one of those "walk in and walk out" dips that Mr. Botterill spoke of, and had found it very successful. There was no trouble in getting the sheep through. Mr. Ellis thought the first step in getting rid of ticks was the shearing. If they were shorn very closely the lice would be destroyed. Mr. Pritchard pointed out that since he started shearing with machines it was scarcely necessary to dip the sheep at all. Mr. Botterill agreed with Mr. Pritchard but he did not think it would be wise to give up dipping. If they took a machine-shorn sheep and examined it after shearing they would not find tick or eggs on it; but lice and their eggs might lie very close to the skin, and if they did not dip they would have ticks and lice next year. The Chairman said there was an argument against turning the sheep out after shearing without dipping. It was hard to muster them again, and those not mustered would become infested with tick, and the ticks from these would spread to others that had been dipped. Nevertheless he thought it was best to make as clean a muster as possible, and dip two months after shearing. Mr. Smith said the trouble with the old dip was to get the sheep to go into it a second time. The Hon. Secretary had been using Cooper's dip at shearing time, and his sheep were not troubled with tick. Mr. Bodey moved—"That in the opinion of this Branch of the Bureau the time has come when the attention of the inspector should be drawn to the fact that tick and lice are very prevalent in this district, and that immediate steps should be taken to enforce the Vermine Act." Mr. Botterill, in seconding the motion, said the stockowners had plenty of machinery to prevent tick if they only used it. Mr. G. H. Kilsby said they should try to prevent sheep coming from Victoria undipped. He had had a lot of trouble with sheep having lice. Mr. J. Keegan agreed with Inspector Williams when he said that one dipping would not get rid of lice. Mr. Botterill thought if a dipping was necessary on account of eggs hatching after shearing it should be the only one. The eggs that remained after shearing should be allowed to hatch and then be killed. Mr. Sassanowsky said a dip that would hold in the wool for a considerable time would poison the lice when they hatched. The motion was carried.

Mount Gambler, November 11.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Wedd (chair), Ellis, Smith, Dow, Sassanowsky, Keegan, Kilsby, Pritchard, F. and J. Holloway, Major, Kennedy, Englebrecht, Schlegel, Buck, Wheeler, and Collins (Hon. Sec.).

THE SEASON.—Mr. Sassanowsky delivered an address giving a rapid review of the past season. The various unexpected changes in weather conditions were described, and their effects upon the crops generally throughout the district were contrasted. A few of the points brought out were that the excessive wet and cold weather was detrimental to bacterial activity in the soils, and also that barley and grasses turned yellow through lack of nitrogen, which was leached out of the soil by the heavy rains. The germination of the seed was also retarded in many instances. Crops on early fallow fared best, while sorrel was fairly plentiful in crops on land which had not been fallowed. It had also been demonstrated that it was a mistake to grow the same crop two years in succession on the same land in the majority of instances. Considerable discussion followed, in which several members took part. Mr. Buck had experienced failure where barley followed barley; but oats after oats succeeded very well. Reference was also made to the prevalence of tick and lice in sheep, and it was thought that the heavy rains washing the dip out of the wool had made it more difficult than usual to keep the pest under control.

Naracoorte, October 7.

(Average annual rainfall, 22 in.)

PRESENT.—Messrs. Wright (chair), Rogers, Langeludecke (jun. and sen.), Coo, Williams, Bray, Loller, Wray, Caldwell, and Schinckel (Hon. Sec.), and one visitor.

ROTATION OF CROPS.—The paper read at the last meeting by Mr. Rogers (see page 337, October issue) was discussed. Mr. Schinckel had prepared a few notes on the paper as follows:—I agree with Mr. Rogers that the subject of rotation of crops is one of great importance to agriculturists of this district. It seems to me to be one of the best methods

of keeping our soil in a good state of fertility and making it more productive. Growing certain varieties of crops continuously takes from the soil certain elements of plant food. This may, to a certain extent, be replaced by a rotation. For instance, leguminous plants provide nitrogen, while forage crops provide humus. A good crop of greenfeed will carry a fair amount of stock for a certain period, and if ploughed immediately after being fed off by stock, practically the whole crop is replaced by the droppings of the stock, which is a complete manure, and is in this way conserved for the following crop. Humus contains potash, nitrates, and phosphates, so must be very valuable to all classes of soils. It helps to close very loose soils, which are thus improved. In stiff clay soils its action is quite the reverse. It leaves them more open, and provides a better drainage, and the soil is not quite so likely to become waterlogged. This must increase the fertility. Rotation of crops if properly conducted should distribute the work of the farm more evenly for the year. It should increase the carrying capacity, as well as improve the health and condition of the stock. Rotation of crops in this district is, in my opinion, in an experimental stage. Therefore experiments are necessary, and these should make farm work more interesting and educational. For a good system of rotation smaller fields than those of the average farm are necessary; otherwise experiments may prove too costly. I very much doubt if a hard and fast rule can be laid down, but I am inclined to think that peas will be found one of the most profitable plants to grow in a system of rotation, either for grain or for forage crop. Peas or greenfeed may not yield so heavily as some other varieties of forage crops, but I fancy the results of the following crops will make up for this deficiency. I am inclined to think that barley draws more heavily on the soil than wheat. With rye I have had but little experience. This important subject is deserving of the attention of every man on the land in the South-East, seeing that we have such a large variety of soils. Mr. Schinckel added that he would adopt a system of rotation as follows—get wheat in first and then some oats. Wheat would always sell, whereas farmers might not be able to sell some other products readily. Of course they would require a little capital to commence a system of rotation at once, and they would require smaller fields than they now had to carry on rotation of crops successfully. They could follow with rye, barley, or white mustard. Mustard was very beneficial. Then they could try some root crops. Peas was very good for cleaning the land. Mr. Loller said the great object of rotation of crops was to keep the land in a state of fertility; they must seek a rotation that would attain that object. He held the view that they should fallow early and get in peas. There were plenty of uses peas could be put to, but they were difficult to harvest. The best way was for several farmers to co-operate and buy a machine. Wheat was always a safe crop, but oats would grow on land where wheat would not. Oats would grow on sour ground and sweeten it. A good rotation was peas, then wheat and oats, and then use the land for grazing. He had tried mustard in the South-East, but had not found it a success. For early feeding rape could not be beaten, but it became a nuisance in the crop. For grazing he had tried Indian Runner wheat and rape with it, but he did not let it go to seed. After this he ploughed the land into a fallow and put peas again. The Chairman said it was a very difficult thing to lay down a hard and fast rule for rotation of crops. Here again they had to take into consideration the character of the land they had to deal with. With Mount Gambier soil they could go on for ever with rotation of crops without wearing the ground out; indeed, it was necessary to have rotation of crops to get the best out of the soil. Supposing they had fallow in this land they would put in a crop of potatoes, then dig them and follow with wheat, and afterwards put in fodder crops. There was no limit to what they could do on first-class soil with a good climate. Mount Gambier people found that wheat did not do well owing to severe frosts, and they now grew malting barley, which did very well with them. In their district the soil was quite different, and they had not a similar climate. For instance, they could not put in potatoes as a rotation crop. They had to use judgment and sow in accordance with the kind of land they were dealing with. Wheat was the best crop for this district, and they could put in green feed in the autumn. He did not think they could follow any particular system. Mr. Rogers agreed with Mr. Schinckel and the Chairman that they required a crop that gave a quick return, and wheat was therefore the best in that respect. To keep the land in good heart he believed that peas were the best to use as a rotation crop. They had so many different soils it was very difficult to fix a rule for their district. Mr. Schinckel said peas did not yield well on land that was too wet. They required fairly dry ground with good drainage. Mr. Loller said he was referring to rotation crops in the Naracoorte district, as the particular end they had in view as an Agricultural Bureau was to find out what was best for their district. His object was to stimulate discussion to that end. He had no doubt wheat was the best for their district when they required quick returns; but oats grew well on sour ground, and the ground in the South-East

was sour and required a rotation of crops that would keep it sweet. He therefore was a believer in getting peas out of fallow. Mr. G. Williams said in his district (Lochaber) they always got the best returns from the second crop on new land. Mr. Schinckel said that was the general experience in the early days, but now conditions were different. They could use manures, and they had star thistle and other weeds to contend with which fouled the land when it came into cultivation. Mr. Wray had found the second crop on new land better than that on the fallow. Mr. C. Bray had the best results from fallow. Mr. Schinckel said that the benefits to be derived from fallow very much depended upon the state of the ground at the time of ploughing. One had to observe carefully what condition the land was in before ploughing, and this could only be ascertained by experience.

Penola, October 7.

(Average annual rainfall, 26½ in.)

PRESENT.—Messrs. Richardson (chair), McDonald, Ricketta, Fullerton, Norman, Kilsby, McBain, and Strong (Acting Hon. Sec.).

CONGRESS: A CRITICISM.—In presenting his report of proceedings at Congress, Mr. Strong considered that some of the papers read were not up to standard. Mr. Fullerton, however, contended that any paper opened up a discussion, and a weak paper sometimes had an advantage in that it was more likely to be picked to pieces; consequently the discussion was greater, and the opinions of more members were expressed than was the case when such a good paper was written that little room for discussion remained.

BREEDING LIGHT HORSES.—In the absence of the writer (Mr. Williams) the Chairman read the following paper:—"The breeding of hacks and buggy horses is one of the most disappointing ventures a breeder can entertain, as the animals have to fulfil so many requirements. In a buggy horse a good body is essential, and this must be supplemented by a good temper and color, an attractive style, and plenty of pace. The same applies to a good hack, with the addition of quality, ease in riding, and the ability to stand up in rough or smooth country. Much injury has been done to the breeding of light horses in Australia through using inferior mares. Years ago, when the demands from India were so great, the high prices offered for mares of quality tempted breeders to part with their best, leaving the second-rate mares and culls to produce the future stock; and the use of such has undoubtedly led to deterioration in the horses of the present day. A common but mistaken opinion regarding a mare that is a failure, either as hack or hackney, is that she can best be used as a breeder. For buggy work I prefer the short-legged, thick class of thoroughbred, which, however, it is hard to find. This style of horse will nick well with either the Welsh cob or Timor pony, according to the breeder's requirements regarding size. A touch of either is good in buggy horses, as they both assist the thoroughbred in the way of bone. They are better doers, and they do not fall far short in endurance. It is a mistake to breed a large animal for buggy work, as the weight tells on the legs, both in the stable and on the roads. Above all, the horse should be good-tempered. I would not breed from a bad-tempered stallion however good he may be in other respects, or however cheap his service; and a bad tempered mare when done for work should not be put to the stud. For hacks the Arab, pure, or crossed with the thoroughbred, stands pre-eminent, being close to the ground, springy in stride, surefooted, fast, with plenty of endurance, spirited yet docile, and, as a rule, is a good doer. One pronounced quality of the Arab is his keenness of eye; each step he watches where his foot is to be placed, and will take either a short or long step as the occasion demands. This makes him safe, which, as I have before mentioned, is by no means the least essential in a good hack. Yet another point regarding the Arab. Generally his hoofs are like whalebone, and with fair treatment he does not require shoeing; and the unshod horse is always the best to ride."

Penola, November 4.

(Average annual rainfall, 26½ in.)

PRESENT.—Messrs. Miller (chair), McDonald, Maxwell, Warner, Fullerton, Adamson, Wilson, Norman, Alexander, Strong, McKay, Peake, and Oakley (Hon. Sec.).

CLOSER SETTLEMENT AGREEMENTS.—Mr. McKay initiated a discussion on this subject. Holders of closer settlement blocks were, in the main, men with small capital, whose profits for the first years were needed to erect the improvements necessary to work their

holding to the greatest advantage; and every assistance was needed to enable them to become prosperous, in which position they were a greater asset to the State. He therefore considered the time allowed for payment for land should be extended to 70 years, and that the payment of principal should not commence until the eleventh year instead of the sixth, as at present. Mr. Adamson considered that little benefit would ensue from the adoption of this proposal, as the greater part of the annual payments consisted of interest. Mr. Norman said that whereas some of the local blocks had been assessed low, many had been valued comparatively high, and consequently many of the holders of the latter had to sell out. Mr. Fullerton pointed out that whenever a settler was obliged to sell out the price obtained was, in almost all cases, above the value of the improvements. Mr. Norman pointed out that land was sometimes of more value to one man than to another. A landholder could turn an additional property to far greater advantage by working it in conjunction with the property he already possessed than could the man who held the former holding by itself. The Hon. Secretary contended that the terms at present were very liberal, although it was doubtless to the advantage of the State to assist as far as possible the primary producer, as almost all other trades prospered according as he prospered. Every applicant for closer settlement land should make his application with open eyes as regards price and prospects, or stand the consequences, just the same as a freehold buyer. The extended terms proposed were exceedingly liberal; 35 years seemed ample in which to pay for a property, although the payment of principal could advantageously be deferred until the eighth or even the eleventh year, since in the initial years the value of the property was greatly enhanced by improvements. The majority of members were of the opinion that the present terms were most satisfactory and fair.

DESTRUCTION OF VERMIN.—The Hon. Secretary drew attention to the dissatisfaction caused by fining people for not keeping down rabbits. The most satisfactory way was to notify the landholder to comply with the vermin regulations within a specified time, or men would be put on to do the work and the landholder charged with cost. Members thought that the district was not troubled with many rabbits, and that the council's instructions were very well attended to in this regard.

KILLING CORK ELMS.—Mr. Peake wished to know how to kill an old cork elm. He had poured $\frac{1}{2}$ gall. of sulphuric acid into the tree, but with no effect. Poplars were readily killed by boring a hole in the trunk and pouring in sulphuric acid. Mr. Fullerton instanced a case where several pines had been killed through stacking salt underneath them.



A USEFUL FIELD ROLLER.

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Training Farm for Boys.

For some time past the Government have had under consideration the establishment of a training farm for boys, with the object of providing for the youth who is inclined to go upon the land, but whose parents are not in a position to assist him to fit himself for such work. A few weeks ago the Minister of Industry and Agriculture announced that the arrangements for carrying the scheme into effect had been practically completed. The new training farm will be situated at Booborowie. Boys from 14 to 16 years of age are eligible for admission, and may stay at the farm for two years, or until they reach the age of 17, which is the maximum age at which they can remain in residence. They will be provided with board and lodging and an allowance of 1s. per week for pocket money, and in addition, provided their conduct is satisfactory, a bonus of £2 10s. will be paid into the Savings Bank to the credit of their respective accounts. During their stay at the farm the boys will receive an elementary training in all branches of farm work, including the cultivation of cereals, the care of sheep and poultry, and the handling of cows. Applications for the positions of superintendent and matron have been received, and it is anticipated that the scheme will be brought into actual operation before the end of February.

The Commonwealth Wheat Harvest.

According to the official estimates the probable wheat yield of Australia for the season will be nearly 77,000,000bush. It is anticipated that Victoria will produce about 26,000,000bush, New South Wales 23,000,000bush., South Australia 20,600,000bush., Western Australia 5,000,000bush., Tasmania 700,000bush., and Queensland 381,000bush. The return for the previous season totalled 94,835,216bush., or nearly 18,000,000bush. more than it is expected will be reaped this season. Deducting the requirements for food and seed, there will, on the estimates, be about 47,000,000bush. of the present crop available for export. It is also estimated that in addition from 8,000,000 bushels to 10,000,000bush. are held as a carry over, and on this basis from 55,000,000bush. to 57,000,000bush. will be available for shipment, or from 6,000,000bush. to 8,000,000bush. less than the quantity exported last wheat season.

District Veterinary Surgeons.

In view of the resolution carried at the September Congress members of the Agricultural Bureau and producers generally will be interested to learn that the Minister of Agriculture (Hon. J. P. Wilson) has decided to appoint another assistant Government veterinary surgeon and to place district veterinary surgeons in the principal country centres. The scheme, as regards the latter, is most comprehensive. Its details are not yet worked out, but it is understood that the veterinary surgeons will be subsidised by the Government for the first few years, by which time it is anticipated they will have established lucrative private practices. It is also proposed that they shall charge uniform fees, deliver lectures to farmers on stock ailments, and conduct for the Government any investigations which may be necessary, but for this latter work they will be specially paid. With a view to securing the services of suitable men the Government Veterinary Surgeon (Mr. J. F. McEachran) proceeded to Melbourne early in December and consulted with Professor Gilruth (Principal of the Melbourne Veterinary College), and it is expected that the scheme will be put into actual operation in February.

The Dairy Herd.

"The value of a dairy herd is gauged by the milking qualifications of the individual cows, not by their conformation or pedigree. At the same time conformation or pedigree must not be undervalued, as the ideal dairy cow must have both, and be a deep milker as well, for the simple reason that characteristics which are inherited are more certain to be transmitted to the progeny. The term 'pedigree' has of recent years acquired quite a different meaning, and is now expected to prove, not only lineage of pure blood, but must also embody descent along a line of heavy milkers, both in quantity and quality."—*Tasmanian Agricultural Gazette*.

The World's Production of Maize.

"According to the latest estimate of the United States Department of Agriculture the world's production of maize is about 3,478,328,000 bush., contributed mainly by the United States, Austro-Hungary, the Argentine, Italy, Roumania, Mexico, and Russia. The Australasian contribution was a little under 9,000,000 bush., about $\frac{1}{4}$ per cent. of the world's production. New South Wales produces rather more than half the Australian crop."—*Agricultural Gazette of New South Wales*.

Unprofitable Cows.

In the November issue of the *Journal of the New Zealand Department of Agriculture* are given pictures of two cows, with the comment that on form there is little to choose between the two animals, and many a dairy-farmer would find it a difficult matter to decide which of the two was the better milker. "Yet," proceeds the comment, "the year's test has demonstrated that No. 1 produced more than double the amount of butter-fat of No. 2. The relative value of the two beasts is thus fully six to one, for the cost of production would be about the same in each case." The cows illustrated were not extreme types, but medium animals to be found in the majority of herds in the Dominion. The writer concludes by stating — "The two instances are sufficient to demonstrate the vast sum of money being lost to the dairy-farmers of New Zealand by the milking of unprofitable cows," a remark which would be equally as true if the words "South Australia" were substituted for "New Zealand."

The Victorian Fruit Crop.

The quantity of fruit which will be available for export from Victoria during the present season is estimated at not less than 200,000 cases. Last season's record was 297,000 cases for the United Kingdom. The first shipment, to be made by the *Arcanus* on February 3rd, will consist of apples, pears, and peaches; and will be made 10 days earlier in the month than the first shipment was forwarded last year.

German Agricultural Experiment Stations.

There are at the present time 72 agricultural experimental stations in Germany, with a staff comprising some 1,378 persons. Out of these stations 28 are supported by one or other of the German States, six by provincial authorities, 29 by chambers of agriculture, and eight by associations, while one is private.

Heredity in Cotton.

The Khedival Agricultural Society of Egypt has voted funds for the establishment of a Mendelian Experiment Station at Cairo, Egypt, for the study of heredity in cotton. This is probably, say the *American Breeders' Magazine*, the first institution devoted to the study and application of Mendelian principles to the improvement of plants for economic purposes.

Increase of Weeds.

The enormous increase which results from allowing weeds to seed may be seen from the following short list, showing the number of seeds each of the weeds named is capable of producing in a single season :—

	Number of Seeds on a Single Plant.
Groundsel	6,500
Corn cockle	2,590
Red poppy	50,000
Charlock	4,000
Sow thistle	19,000
Blackhead	3,000
Shepherd's purse.....	4,500
Cow parsnip.....	5,000
Stinking camomile	40,000
Ox-eye daisy	13,500
Burdock	24,520
Common dock	13,000
Dandelion.....	2,040

—*Mark Lane Express.*

Tasmanian Fruit Shipments.

According to a report by the secretary to the Tasmanian Agent-General, 691,516 cases of fruit were shipped from Tasmania to England during 1911. The writer states that the fruit on the whole was not so good as in some previous years, and, referring to shipments by the later steamers, says that it is a great pity that a good quantity of the fruit was ever shipped. The prices for the shipments of apples to the middle of June were on the whole good, but after that time there was a heavy fall in the rates realised. Stress is laid in the advantages to be gained by shipping early in the season and the necessity for more attention being paid to the important details—grading and packing.

Jersey Tests—Richmond River, N.S.W.

In connection with the prizes offered by the Australian Jersey Herd Society, through the Lismore Agricultural Society, for the cows giving the most commercial butter in 24 hours. The following are the yields of the three best cows :—T. H. Brooker's Bobtail Beauty, 35·43lbs. milk, 4·4 per cent. fat, 27½ozs. commercial butter; H. O'Meara's Janet's Queen, 27·50lbs. milk, 5·5 per cent. fat, 27½ozs. commercial butter; H. O'Meara's Neatrices, 30·68lbs. milk, 4·8 per cent. fat, commercial butter 26½ozs.

Discovery of Gypsum near Lake Bonney.

According to *The Renmark Pioneer*, Mr. H. H. Wescombe, Manager of the Berri Experimental Farm, when in Renmark recently announced that he had discovered an immense deposit of gypsum close to Lake Bonney, and that the supply in sight might be regarded as practically inexhaustible. The distance from Berri is some eight miles over a better track than that which divides Renmark from its gypsum fields, and Mr. Wescombe had hopes of finding a deposit nearer to Berri than this. "Part of the experimental farm," says the *Pioneer*, "runs into the flat, and Mr. Wescombe has already discovered that this land in its present state is not suitable for lucerne-growing. It will not take the water well, and sets into a hard pan after irrigation. The effect of the application of gypsum to this land should prove a valuable object-lesson to settlers on the flat."

Remarkable Milking Shorthorns.

The Live Stock Journal refers at some length to the milking Shorthorn cows at the London Dairy Show in October. The first prize cow (shown by the Duke of Portland) yielded, in two days, 66lbs. of milk in the mornings, testing 3.55 per cent. fat, and 56lbs., testing 3.97 per cent. fat, in the evenings. Darlington Crawford, as she is called, is not a large cow, nor does she carry an enormous udder, which, however, is full behind and somewhat high in front, broad but not pendent. The skin is fine and soft and the milk veins large. Red Rose, the winner in another class, produced 128lbs. of milk in two days, the morning's milk averaging 4.18 per cent. and the evening's 4.49 per cent., a remarkable record. Another Shorthorn cow, Dairymaid, gave 102lbs. of milk in two days with the extraordinary tests of 6.38 per cent. and 6.77 per cent. fat morning and evening.

U.S.A. Agricultural Experiment Stations.

According to the report of the Secretary of Agriculture of the United States for 1910, there are now 62 agricultural experiment stations in active work in that country. Fifty-five of these stations receive appropriations provided for by Acts of Congress, which amounted to £269,000 in the fiscal year 1909-10; in addition £200,000 was contributed by the State Legislatures, and £150,000 was received by the stations as fees for analyses of fertilisers, sales of farm products, and from other local sources. The total annual revenue is over £600,000, as compared with half that sum in 1905. The stations annually issue about 500 publications, which are regularly sent to over 900,000 addresses, mainly those of farmers.

Dynamite in the Orchard.

"At various times," writes *The Renmark Pioneer*, "references to the practice of using dynamite in the orchard have appeared in these pages. Dynamite was used in Renmark in the early days, notably by Mr. Charles Chaffey at Olivewood, where charges were exploded under the young orange trees, in order to open up the earth for their roots. Naturally its use is only called for in land with a stiff or intractable subsoil. Mr. Albert Pike recently stated that he intended to adopt a modification of the American practice at his 'Clairville' orange orchard. An impervious hard pan has formed in the soil at a depth of from 9in. to 2ft. below the surface, and he wants to give the water a chance to get through this. Subsoiling is rendered impossible by granite boulders. The Americans, he states, bore a hole at an angle under the tree and fire a half-plug of dynamite in it. His intention was to use 5lbs. of gunpowder in each hole, instead of dynamite, before irrigating. The effect of the gunpowder, it is said, is to break up the ground in waves."

Imports and Exports of Fruits and Plants.

During the month of December 5,251bush. of fresh fruits, 146pkgs. of vegetables, 2,162 bags of potatoes, 139 bags of onions, and 48pkgs. plants from inter-State markets were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act, 1885; 340bush. of bananas (chiefly overripe) were destroyed. Under the Federal Commerce Act 1,887 cases of fresh fruit, 249 pkgs. preserved fruit, 641pkgs. dried fruit and 501 cases honey were examined and exported to oversea markets during the same period. These were distributed as follows:—For New Zealand, 1,292 cases citrus fruit, 585 cases cherries, 10 cases peaches, and 175pkgs. preserved fruit; for London, 500pkgs. dried fruit and 101 cases honey; for Germany, 400 cases of honey; for South Africa, 140pkgs. dried fruit; for India and East, 74pkgs. preserved fruit and 1pkg. dried fruit. Under the Federal Quarantine Act 1,404pkgs. plants, seeds, bulbs, &c., were admitted from oversea sources.

The Wheat Standard.

At a meeting of the Corn Trade Section of the Chamber of Commerce on Wednesday, January 10th, the weight of the standard bushel of wheat was fixed at 61½lbs.

ROSEWORTHY AGRICULTURAL COLLEGE.

Experiments Relating to the Depth of Sowing of Some Agricultural Seeds.

By ARTHUR J. PERKINS (Principal Roseworthy Agricultural College) and
W. J. SPAFFORD (Assistant Experimentalist).

(Continued from page 498.)

SORGHUM.

In this district sorghum is occasionally sown as a summer fallow crop, although perhaps more frequently so than maize. It is usually sown later than the latter crop, and even more than maize, therefore, is it dependent for the regularity of its germination on what rains chance to fall subsequently to seeding operations; hence, when consideration is given to the results of our experiments on the sowing of sorghum at various depths, parallel reference should be made to the account of each season which immediately preceded what we had to say on the subject with reference to maize.

These experiments with sorghum took place in 1908 and 1909, and were carried out in both light sandy soil and heavy clay loam.

SORGHUM IN LIGHT SANDY SOIL IN 1908.

In 1908 fifty sorghum seeds were sown at depths between $\frac{1}{2}$ in. and 6 in. in light sandy soil on September 23rd. General germination results are shown below in Table XLI.

TABLE XLI.—*Showing the Germination of Sorghum Sown at Various Depths in Light Sandy Land in 1908.*

Depth of Sowing.	Germination Order and Numbers.														
	October.														
	4	5	6	7	8	9	10	11	12	13	14	15			
$\frac{1}{2}$ in.	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—
1 in.	6	11	12	—	2	—	—	—	—	—	—	—	—	—	—
1½ in.	1	16	15	3	—	—	—	5	—	—	—	—	—	—	—
2 in.	—	3	17	9	—	—	—	9	2	—	—	—	—	—	—
2½ in.	—	—	14	7	7	2	4	1	3	—	—	1	—	—	—
3 in.	—	—	3	12	6	8	—	4	—	—	—	1	—	—	—
3½ in.	—	—	—	—	5	20	4	5	3	—	—	—	—	—	—
4 in.	—	—	—	—	2	14	2	10	1	1	—	—	—	—	—
4½ in.	—	—	—	—	—	7	6	9	—	2	1	—	—	—	—
5 in.	—	—	—	—	—	1	—	8	2	—	—	2	—	2	—
5½ in.	—	—	—	—	—	—	—	—	—	6	—	—	—	2	—
6 in.	—	—	—	—	—	—	—	—	—	2	1	4	—	—	—

TABLE XLI.—*continued.*

Depth of Sowing.	Germination Order and Numbers.													Total Number Germinated.
	October.													
	16	17	18	19	20	21	22	23	24	25	26	27		
$\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	22	23	
1in.	—	—	—	—	1	—	—	—	—	—	—	—	32	
$1\frac{1}{2}$ in.	—	—	—	—	2	—	—	—	—	—	—	—	42	
2in.	—	—	—	—	—	—	—	—	—	—	—	—	40	
$2\frac{1}{2}$ in.	—	—	—	—	1	—	—	—	—	—	—	—	40	
3in.	—	—	—	—	2	—	—	—	—	—	—	—	36	
$3\frac{1}{2}$ in.	—	1	—	—	1	—	—	—	—	—	—	—	39	
4in.	—	—	—	—	1	—	—	—	—	—	—	—	31	
$4\frac{1}{2}$ in.	—	—	—	—	1	—	—	—	—	—	—	—	26	
5in.	—	—	—	—	1	—	—	—	—	—	—	—	16	
$5\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	8	
6in.	2	1	—	—	—	—	—	—	—	—	—	—	10	

Table XLI. shows clearly that for sorghum under the conditions in which it is usually grown here very shallow seeding is not to be depended upon. It is true that at the $\frac{1}{2}$ in. depth there was ultimately a 46 per cent. germination. Of this, however, 44 per cent. of the seed sown did not germinate until 34 days after seeding operations, evidently under the influence of tolerably heavy rains falling on the 15th and 16th October; and this notwithstanding the fact that 3.37in. of rain had fallen in the first 22 days of September that preceded seeding operations. On the other hand, germination showed itself good and regular for all depths between 1in. and $2\frac{1}{2}$ in.; it was still very fair between 3in. and 4in., but fell away rapidly at greater depths.

The plants of this series, after the ordeal of an unusually dry summer, were harvested on January 14th. Full details concerning the results are shown below in Table XLII.

TABLE XLII.—*Showing Harvest Results of Sorghum Sown at Various Depths in Light Sandy Land in 1908.*

Depth of Sowing.	Plants		Percentage of Germinated Plants Dying	Weight of Plants.		
	Germinated Out of 50.	Matured Out of 50.		Off. %	Total.	Individual.
					Ozs.	Ozs.
$\frac{1}{2}$ in.	23	4	74	24	6.0	
1in.	32	8	75	32	4.0	
$1\frac{1}{2}$ in.	42	15	64	52	3.5	
2in.	40	24	40	84	3.5	
$2\frac{1}{2}$ in.	40	19	52	84	4.4	
3in.	36	24	33	92	3.8	
$3\frac{1}{2}$ in.	39	22	44	60	2.7	
4in.	31	21	32	72	3.4	
$4\frac{1}{2}$ in.	26	19	27	48	2.5	
5in.	16	11	31	40	3.6	
$5\frac{1}{2}$ in.	8	3	63	4	1.3	
6in.	10	3	70	12	4.0	

Table XLII. shows that for all depths of sowing the percentage of germinated plants failing to reach maturity was very considerable in 1908.

This mishap is to be attributed to the unusual dryness of the summer months, the combined November and December fall totalling a little over a quarter of an inch. The percentage of plants dying off, however, was greatest for depths of $\frac{1}{2}$ in. to $1\frac{1}{2}$ in. and $5\frac{1}{2}$ in. and 6 in. respectively. On the whole, if we take yields into consideration on the one hand and percentage of germinated plants reaching maturity on the other, we find that the most satisfactory results for sorghum sown in light sandy land in 1908 were secured from depths of sowing between 2 in. and 4 in.

SORGHUM IN LIGHT SANDY LAND IN 1909.

In 1909 fifty sorghum seeds were sown at depths of $\frac{1}{2}$ in. to 6 in. in light sandy land on October 19th. Germination results are shown below in Table XLIII.

TABLE XLIII.—*Showing the Germination of Sorghum Sown at Various Depths in Light Sandy Land in 1909.*

Depth of Sowing.	Germination Order and Numbers.																	
	October.									November.								
	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9		
$\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	9	—	2	—	—		
1 in.	—	—	1	—	—	—	—	9	1	3	13	10	—	1	—	—		
$1\frac{1}{2}$ in.	2	4	3	4	6	4	2	4	—	3	2	—	—	—	—	—		
2 in.	1	6	5	6	6	—	1	6	—	1	2	1	—	—	—	—		
$2\frac{1}{2}$ in.	1	1	11	9	4	1	1	3	—	—	1	1	—	—	—	—		
3 in.	—	3	12	16	1	—	—	—	2	—	1	1	—	—	—	—		
$3\frac{1}{2}$ in.	—	1	17	11	4	—	—	1	1	—	1	—	—	1	—	—		
4 in.	—	1	6	18	6	—	—	2	—	—	—	—	—	—	—	—		
$4\frac{1}{2}$ in.	—	—	3	8	10	3	2	2	—	1	2	—	—	—	—	—		
5 in.	—	—	4	9	10	4	1	3	1	—	2	1	—	—	—	—		
$5\frac{1}{2}$ in.	—	—	—	6	2	7	3	11	—	—	—	—	—	—	—	—		
6 in.	—	—	—	3	5	5	5	5	1	—	—	—	—	—	—	—		

Depth of Sowing.	Germination Order and Numbers.																	
	November.																	
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
$\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	17	—	—	—	—	—	1	32
1 in.	2	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	41
$1\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	34
2 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35
$2\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33
3 in.	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	37
$3\frac{1}{2}$ in.	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	38
4 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33
$4\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31
5 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35
$5\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	29
6 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24

Table XLIII. shows the germination of sorghum in light sandy land to have been very irregular in 1909 at the shallow depths of $\frac{1}{2}$ in. and 1 in. At depths between $1\frac{1}{2}$ in. and $3\frac{1}{2}$ in., on the other hand, germination was both regular and satisfactory. At greater depths the results, whilst on the whole perhaps passable, were not quite so good.

Plants of this series were duly harvested on February the 9th. Full results concerning them are shown below in Table XLIV.—

TABLE XLIV.—*Showing Harvest Results of Sorghum Sown at Various Depths in Light Sandy Land in 1909.*

Depth of Sowing.	Plants		Percentage of Germinated Plants Dying Off.	Weight of Plants.	
	Germinated Out of 50.	Matured Out of 50.		Total. Ozs.	Individual. Ozs.
$\frac{1}{2}$ in.	32	28	13	200	7.1
1 in.	41	35	15	208	5.9
1 $\frac{1}{2}$ in.	34	26	24	128	4.9
2 in.	35	31	11	112	3.6
2 $\frac{1}{2}$ in.	33	30	9	96	3.2
3 in.	37	30	23	112	3.7
3 $\frac{1}{2}$ in.	38	30	27	88	2.9
4 in.	33	26	21	96	3.7
4 $\frac{1}{2}$ in.	31	31	—	104	3.4
5 in.	35	33	6	112	3.4
5 $\frac{1}{2}$ in.	29	24	17	56	2.3
6 in.	24	18	25	20	1.1

In 1909, a season in which summer showers were more frequent than was the case in 1908, the percentage of germinated plants dying off was lower, and yields generally were heavier than in 1908. It should be noted, too, that in this year the yields from the shallow depths were on the whole better than those of the greater depths.

SUMMARY OF THE GERMINATION OF SORGHUM SOWN IN LIGHT SANDY LAND OVER TWO SEASONS.

It remains for us to summarise the results of the two seasons in Table XLV.—

TABLE XLV.—*Showing Summary of Germination Results, together with Average Germination Percentages, of Sorghum Sown at Various Depths in Light Sandy Land in 1908 and 1909.*

Depth of Sowing.	Numbers Germinated.		Average Germination Percentage.	Average Percentage Matured.	Average Percentage of Plants Dying Off After Germina- tion.
	Out of 50. 1908.	Out of 50. 1909.			
$\frac{1}{2}$ in.	23	32	% 55	% 32	% 42
1 in.	32	41	73	43	41
1 $\frac{1}{2}$ in.	42	34	76	41	46
2 in.	40	35	75	55	27
2 $\frac{1}{2}$ in.	40	33	73	49	33
3 in.	36	37	73	54	26
3 $\frac{1}{2}$ in.	39	38	77	52	32
4 in.	31	33	64	47	27
4 $\frac{1}{2}$ in.	26	31	57	50	12
5 in.	16	35	51	44	14
5 $\frac{1}{2}$ in.	8	29	37	27	27
6 in.	10	24	34	21	38

On the whole, therefore, taking into consideration average germination percentage, together with the percentage of germinated plants that are able to survive, the best depth for sowing sorghum in light sandy land would appear to vary between 2in. and 3in.

The rate of germination of sorghum in light sandy land for the two seasons 1908 and 1909 may be summarised as follows:—

Germinated plants showed above ground—

16 to 37 days after seeding when sown	$\frac{1}{2}$ in. deep.
9 to 30	1in. "
8 to 22	1 $\frac{1}{2}$ in. "
9 to 18	2in. "
9 to 22	2 $\frac{1}{2}$ in. "
10 to 25	3in. "
11 to 25	3 $\frac{1}{2}$ in. "
11 to 20	4in. "
12 to 22	4 $\frac{1}{2}$ in. "
12 to 22	5in. "
14 to 18	5 $\frac{1}{2}$ in. "
14 to 19	6in. "

SORGHUM IN HEAVY CLAY LOAM IN 1908.

In 1908 fifty grains of sorghum were sown on September the 23rd at depths between $\frac{1}{2}$ in. and 6in. in heavy clay loam. Full details concerning germination are shown below in Table XLVI.—

TABLE XLVI.—*Showing the Germination of Sorghum Sown at Various Depths in Heavy Clay Loam in 1908 on September 23rd.*

Depth of Sowing.	Germination Order and Numbers.														
	October.														
	5	6	7	8	9	10	11	12	13	14	15				
$\frac{1}{2}$ in.	—	—	—	—	—	1	—	—	—	—	—				
1in.	23	11	—	—	—	—	1	—	—	2	—				
1 $\frac{1}{2}$ in.	18	15	2	1	—	—	4	—	—	—	—				
2in.	1	18	5	3	3	—	2	4	—	—	—				
2 $\frac{1}{2}$ in.	—	11	8	1	6	3	1	2	—	1	1				
3in.	—	2	5	5	8	—	2	5	2	2	—				
3 $\frac{1}{2}$ in.	—	—	2	4	8	7	5	6	—	—	—				
4in.	—	—	—	—	—	5	3	9	—	1	3				
4 $\frac{1}{2}$ in.	—	—	—	—	—	3	2	9	2	2	1				
5in.	—	—	—	—	—	—	2	3	5	5	1				
5 $\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	4	—	3				
6in.	—	—	—	—	—	—	—	—	—	1	2				

TABLE XLVI.—*continued.*

Depth of Sowing.	Germination Order and Numbers.													Total Number Germinated.
	October.													
	16	17	18	19	20	21	22	23	24	25	26	27		
$\frac{1}{2}$ in.	1	—	—	—	—	—	—	—	—	—	—	22	24	
1 in.	—	—	—	—	1	—	—	—	—	—	—	4	42	
$1\frac{1}{2}$ in.	—	—	—	—	1	—	—	—	—	—	—	—	41	
2 in.	1	—	—	—	—	—	—	—	—	—	—	2	39	
$2\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	2	36	
3 in.	—	—	—	—	1	—	—	—	—	—	—	—	32	
$3\frac{1}{2}$ in.	—	—	—	—	1	—	—	—	—	—	—	—	33	
4 in.	—	—	—	—	—	—	—	—	—	—	—	—	21	
$4\frac{1}{2}$ in.	1	—	—	—	—	—	—	—	—	—	—	—	20	
5 in.	3	—	—	—	—	—	—	—	—	—	—	—	19	
$5\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	7	
6 in.	3	—	—	—	—	1	—	—	—	—	—	2	9	

Table XLVI. shows sorghum to have germinated irregularly in heavy clay loam in 1908 when sown only $\frac{1}{2}$ in. deep. The most satisfactory results in this direction appear to have been secured for depths varying between 1 in. and 2 in.

The plants of this series were duly harvested on January 7th. Full details concerning them are shown below in Table XLVII.—

TABLE XLVII.—*Showing Harvest Results of Sorghum Sown at various Depths in Heavy Clay Loam in 1908.*

Depth of Sowing.	Plants		Percentage of Germinated Plants Dying Off. %	Weight of Plants.	
	Germinated Out of 50.	Matured Out of 50.		Total. Ozs.	Individual. Ozs.
$\frac{1}{2}$ in.	24	7	71	12	1.7
1 in.	42	24	43	60	2.5
$1\frac{1}{2}$ in.	41	27	34	64	2.4
2 in.	39	24	38	56	2.3
$2\frac{1}{2}$ in.	36	20	44	52	2.6
3 in.	32	20	38	76	3.8
$3\frac{1}{2}$ in.	33	19	42	68	3.6
4 in.	21	14	33	44	3.1
$4\frac{1}{2}$ in.	20	15	25	60	4.0
5 in.	19	10	47	28	2.8
$5\frac{1}{2}$ in.	7	4	43	4	1.0
6 in.	9	8	11	16	2.0

The percentage of germinated plants failing to reach maturity was again heavy in the dry 1908 summer; and particularly so for the $\frac{1}{2}$ in. depth, at which close on three-quarters of the germinated plants perished comparatively early in the season. From the point of view of the survival of germinated plants and general yields, the most satisfactory results appear to have been secured at depths varying between $1\frac{1}{2}$ in. and 3 in.

SORGHUM IN HEAVY CLAY LOAM IN 1909.

In 1909 fifty grains of sorghum were sown in heavy clay loam at depths varying between $\frac{1}{2}$ in. and 6 in. on October 16th. Full details concerning germination are shown below in Table XLVIII.—

TABLE XLVIII.—*Showing the Germination of Sorghum Sown at Various Depths in Heavy Clay Loam in 1909.*

Depth of Sowing.	Germination Order and Numbers.														
	October.										November.				
	24	25	26	27	28	29	30	31	1	2	3	4	5		
$\frac{1}{2}$ in.	4	8	—	1	—	2	1	—	5	—	—	3	4		
1 in.	19	15	4	3	—	—	2	1	—	—	—	—	—		
$1\frac{1}{2}$ in.	15	12	3	7	—	—	—	—	—	—	4	—	—		
2 in.	8	14	8	2	1	2	—	1	—	—	—	—	1		
$2\frac{1}{2}$ in.	1	11	8	13	4	2	—	—	—	—	—	—	—		
3 in.	—	8	5	16	1	4	1	—	1	—	—	—	1		
$3\frac{1}{2}$ in.	—	4	6	11	5	1	2	—	2	—	—	1	—		
4 in.	—	2	1	6	8	1	—	1	2	1	—	1	1		
$4\frac{1}{2}$ in.	—	—	5	5	3	5	3	—	—	—	2	3	—		
5 in.	—	—	—	2	6	4	5	—	2	—	3	1	—		
$5\frac{1}{2}$ in.	—	—	—	4	8	5	7	—	8	—	—	1	—		
6 in.	—	—	—	1	—	15	4	—	10	—	1	2	1		

Depth of Sowing.	Germination Order and Numbers.																			Total Nos. Germinated.
	November.																			
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20					
$\frac{1}{2}$ in.	—	2	—	—	—	—	—	—	—	—	—	—	—	—	14	44				
1 in.	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	43				
1 $\frac{1}{2}$ in.	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	43				
2 in.	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	38				
2 $\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	39				
3 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	37				
3 $\frac{1}{2}$ in.	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	33				
4 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24				
4 $\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	26				
5 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23				
5 $\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33				
6 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	34				

In 1909 the germination percentage of sorghum sown $\frac{1}{2}$ in. deep in heavy clay loam was very good, viz., 88 per cent.; of this, however, 28 per cent. of the germinated plants did not show above ground until 35 days after seeding, under the influence of heavy mid-November rains. Germination was more regular for depths varying between 1 in. and 2 $\frac{1}{2}$ in.

Plants of this series were harvested on February the 9th. Full details concerning them are given in Table XLIX.

TABLE XLIX.—*Showing Harvest Results of Sorghum Sown at Various Depths in Heavy Clay Loam in 1909.*

Depth of Sowing.	Plants		Percentage of Germinated Plants Dying Off. %	Weight of Plants.	
	Germinated Out of 50.	Matured Out of 50.		Total. Ozs.	Individual. Ozs.
$\frac{1}{2}$ in.	44	44	—	320	7.3
1 in.	45	39	13	320	8.2
$1\frac{1}{2}$ in.	43	39	9	240	6.2
2 in.	38	38	—	288	7.6
$2\frac{1}{2}$ in.	39	37	5	208	5.6
3 in.	37	37	—	224	6.1
$3\frac{1}{2}$ in.	33	33	—	288	8.7
4 in.	24	24	—	272	11.3
$4\frac{1}{2}$ in.	26	26	—	240	9.2
5 in.	23	19	17	176	9.3
$5\frac{1}{2}$ in.	33	31	6	176	5.7
6 in.	34	34	—	208	6.1

The striking feature of this series is the very low percentage of plants that died back after germination, and this practically for all depths. This fact is to be attributed to the favorable summer conditions which was the pleasing characteristic of the 1909-10 season. Yields, too, were good throughout, but best perhaps for the $\frac{1}{2}$ in. and 1 in. depths.

SUMMARY OF THE GERMINATION OF SORGHUM SOWN IN HEAVY CLAY LOAM OVER TWO SEASONS.

Below, in Table L., we have summarised the results of the two seasons' experiments—

TABLE L.—*Showing Summary of Germination Results, together with Average Germination Percentages, of Sorghum Sown at Various Depths in Heavy Clay Loam in 1908 and 1909.*

Depth of Sowing.	Numbers Germinated.		Average Germination Percentage.	Average Percentage Matured.	Average Percentage of Plants Dying Off After Germina- tion.
	Out of 50. 1908.	Out of 50. 1909.			
$\frac{1}{2}$ in.	24	44	68	51	25
1 in.	42	45	87	63	28
$1\frac{1}{2}$ in.	41	43	84	66	21
2 in.	39	38	77	62	19
$2\frac{1}{2}$ in.	36	39	75	57	24
3 in.	32	37	67	57	15
$3\frac{1}{2}$ in.	33	33	66	52	21
4 in.	21	24	45	38	16
$4\frac{1}{2}$ in.	20	26	46	41	11
5 in.	19	23	42	29	31
$5\frac{1}{2}$ in.	7	33	40	35	13
6 in.	9	34	43	42	2

Hence, when sown in heavy clay loam the most satisfactory results appear to have been secured with sorghum when sown at depths varying between $1\frac{1}{2}$ in. and $2\frac{1}{2}$ in.

If we summarise the rate of germination for the various depths in the two seasons we find that the plants showed above ground—

13 to 35 days after seeding when sown	$\frac{1}{2}$ in. deep.
10 to 29	“ “ 1 in. “
10 to 25	“ “ $1\frac{1}{2}$ in. “
10 to 29	“ “ 2 in. “
10 to 24	“ “ $2\frac{1}{2}$ in. “
11 to 24	“ “ 3 in. “
11 to 25	“ “ $3\frac{1}{2}$ in. “
13 to 21	“ “ 4 in. “
13 to 21	“ “ $4\frac{1}{2}$ in. “
14 to 21	“ “ 5 in. “
15 to 21	“ “ $5\frac{1}{2}$ in. “
15 to 28	“ “ 6 in. “

GENERAL CONCLUSIONS.

From our work dealing with the sowing of sorghum at various depths we derive the following conclusions—

1. It is not advisable to sow sorghum seed at depths which are perfectly safe for maize.

2. For sorghum, shallow sowing represented by about an inch in depth would probably be best, whenever one is able to rely on a sufficiency of moisture in the surface layers of the soil, not only to bring about immediate germination of the seed, but also to protect the young seedlings from early spring drought and heat.

3. Ordinary spring and summer conditions are, however, such in this district that very shallow sowing cannot be recommended. The usual result of very shallow sowing, particularly if the soil be tolerably light in texture, is very tardy and irregular germination, with an accompanying inability in a large proportion of the germinated plants to protect themselves sufficiently against early spring drought.

4. Whatever the type of soil, the most suitable depth for sowing is represented by the most superficial layer sufficiently moist to offer good germinating conditions. In ordinary circumstances this would be represented by 2 in. to $2\frac{1}{2}$ in. in light soils and by 1 in. to 2 in. in heavy soils. In cases of late seeding even greater depths may be recommended.

5. For the depths of sowing recommended, the germination of sorghum may, according as the weather conditions are more or less favorable, be expected to extend over nine to 22 days after seeding in light sandy soil, and over 10 to 30 days in heavy clay loam.

MILLET.

In this district the various millets are perhaps even more precarious as summer fallow crops than either maize or sorghum; they have, nevertheless, occasionally given very fair crops on the College Farm. With us, however, germination of millet has frequently proved very unsatisfactory. This mishap we are inclined to attribute very largely to the defective character of much of the seed put up on local markets. Our experiments with millets were carried out in 1908 and 1909 on lines already indicated for sorghum.

MILLET IN LIGHT SANDY LAND IN 1908.

In 1908 fifty grains of millet were sown on September 22nd in light sandy land at depths varying from $\frac{1}{2}$ in. to 6 in. Full details concerning germination are given below in Table LI.—

TABLE LI.—*Showing the Germination of Millet Sown at Various Depths in Light Sandy Land in 1908.*

Depth of Sowing.	Germination Order and Numbers.																				Total Number Germinated.
	October.																				
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
$\frac{1}{2}$ in.	—	4	6	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12	
1 in.	3	5	4	3	4	—	—	—	—	—	—	—	—	—	—	1	—	—	—	20	
1½ in.	—	1	9	5	1	—	—	—	—	—	—	—	—	2	—	2	—	—	—	20	
2 in.	—	—	1	3	4	—	—	—	—	—	—	—	—	3	—	—	—	—	1	12	
2½ in.	—	—	—	3	2	—	—	—	—	1	—	—	—	—	—	—	—	—	—	2	
3 in.	—	—	—	2	3	—	—	—	—	—	—	2	—	—	—	—	—	—	—	7	
3½ in.	—	—	—	—	—	—	—	—	2	1	2	—	1	—	—	—	—	—	—	6	
4 in.	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	2	—	—	—	3	
4½ in.	—	—	—	—	—	—	—	—	—	2	1	—	—	—	—	—	—	—	1	4	
5 in.	—	—	—	—	—	—	—	—	—	—	4	—	1	—	—	—	—	—	—	5	
5½ in.	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	—	—	—	2	
6 in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

It will be noted that, unlike maize and sorghum seed, the seed of millet does not appear to have been affected by rains falling subsequently to seeding when sown at very shallow depths. On the whole the germinating power of the seed used must have been very faulty, seeing that the best germination percentage secured was represented by 40 per cent.

No harvest results can be given, as all plants perished under stress of dry summer conditions without attaining to maturity.

MILLET IN LIGHT SANDY LAND IN 1909.

In 1909 fifty grains of millet were sown on October 18th at various depths in light sandy land. Full germination details are given below in Table LII.—

TABLE LII.—*Showing the Germination of Millet Sown at Various Depths in Light Sandy Land in 1909.*

Depth of Sowing.	Germination Order and Numbers.												
	October.							November.					
	25	26	27	28	29	30	31	1	2	3	4	5	6
$\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	1	7	3	3	—
1in.	—	1	1	1	2	6	2	9	1	2	—	—	—
$1\frac{1}{2}$ in.	2	6	5	1	2	2	1	7	1	3	—	—	—
2in.	5	8	3	—	—	1	1	3	—	—	1	1	—
$2\frac{1}{2}$ in.	1	6	12	1	2	—	—	4	—	—	1	—	—
3in.	—	8	12	2	—	—	—	—	1	—	—	—	—
$3\frac{1}{2}$ in.	—	11	10	2	—	—	—	—	—	—	—	—	—
4in.	—	6	14	4	—	—	—	—	—	—	1	—	—
$4\frac{1}{2}$ in.	—	2	7	5	5	—	2	—	—	—	—	—	—
5in.	—	—	3	1	—	1	1	—	—	—	—	—	—
$5\frac{1}{2}$ in.	—	—	2	5	1	2	—	2	—	—	1	—	—
6in.	—	—	3	3	2	1	—	1	—	—	—	—	—

Depth of Sowing.	Germination Order and Numbers.														Total Numbers Germinated.
	November.														
	7	8	9	10	12	13	14	15	16	17	18	19	20		
$\frac{1}{2}$ in.	1	—	—	—	—	3	—	—	—	—	—	—	4	22	
1in.	—	—	—	—	—	—	—	—	—	—	—	—	—	25	
$1\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	30	
2in.	—	—	—	—	—	—	—	—	—	—	—	—	—	23	
$2\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	27	
3in.	—	—	—	—	—	—	—	—	—	—	—	—	—	23	
$3\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	23	
4in.	—	—	—	—	—	—	—	—	—	—	—	—	—	25	
$4\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	21	
5in.	—	—	—	—	—	—	—	—	—	—	—	—	—	6	
$5\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—	13	
6in.	—	—	—	—	—	—	—	—	—	—	—	—	—	10	

The germination of the millet seed in 1909, although better than in 1908, was still far from satisfactory. The highest germination percentage secured was represented by 60 per cent. for the $1\frac{1}{2}$ in. depth of sowing. In the present season, too, the germination of seed sown $\frac{1}{2}$ in. deep was both irregular and unduly prolonged.

The plants of this series were harvested on February 9th. Full data concerning them are shown below in Table LIII.—

TABLE LIII.—*Showing Harvest Results of Millet Sown at Various Depths in Light Sandy Land in 1909.*

Depth of Sowing.	Plants		Percentage of Germinated Plants Dying	Weight of Plants.	
	Germinated Out of 50.	Matured Out of 50.		Total. Ozs.	Individual. Ozs.
$\frac{1}{2}$ in.	22	21	5	112	5.3
1 in.	25	21	16	136	6.5
$1\frac{1}{2}$ in.	30	24	20	116	4.8
2 in.	23	19	17	94	4.9
$2\frac{1}{2}$ in.	27	19	30	76	4.0
3 in.	23	18	22	64	3.6
$3\frac{1}{2}$ in.	23	17	26	92	5.4
4 in.	25	21	16	92	4.4
$4\frac{1}{2}$ in.	21	11	48	56	5.1
5 in.	6	5	17	34	6.8
$5\frac{1}{2}$ in.	13	8	39	42	5.4
6 in.	10	10	—	16	1.6

Table LIII. shows, therefore, that in light sandy land we may expect the best results from millet sown from 1 in. to $1\frac{1}{2}$ in. deep.

SUMMARY OF THE GERMINATION OF MILLET SOWN IN LIGHT SANDY LAND OVER TWO SEASONS.

We have summarised below in Table LIV. the results of these two years' experiments with millet in light sandy land—

TABLE LIV.—*Showing Summary of Germination Results, together with Average Germination Percentages, of Millet Sown at Various Depths in Light Sandy Land in 1908 and 1909.*

Depth of Sowing.	Numbers Germinated. Out of 50.		Average Germination. Percentage.
	1908.	1909.	
$\frac{1}{2}$ in.	12	22	34
1 in.	20	25	45
$1\frac{1}{2}$ in.	20	30	50
2 in.	12	23	35
$2\frac{1}{2}$ in.	6	27	33
3 in.	7	23	30
$3\frac{1}{2}$ in.	6	23	29
4 in.	3	25	28
$4\frac{1}{2}$ in.	4	21	25
5 in.	5	6	11
$5\frac{1}{2}$ in.	2	13	15
6 in.	—	10	10

Table LIV. shows that for millet sown in light sandy land the most favorable germination results were secured at depths between 1 in. and $1\frac{1}{2}$ in.

Taking the two seasons, the average rate of germination of millet in light sandy land may be summarised as follows:—

The millet plants showed above ground—

13 to 23 days when sown	$\frac{1}{2}$ in.	deep
9 to 21	1 in.	"
9 to 21	$1\frac{1}{2}$ in.	"
9 to 23	2 in.	"
10 to 18	$2\frac{1}{2}$ in.	"
10 to 18	3 in.	"
13 to 16	$3\frac{1}{2}$ in.	"
13 to 21	4 in.	"
13 to 21	$4\frac{1}{2}$ in.	"
14 to 18	5 in.	"
15 to 21	$5\frac{1}{2}$ in.	"
?	6 in.	"

MILLET IN HEAVY CLAY LOAM IN 1908.

In 1908 fifty grains of millet were sown on September 24th in heavy clay loam at depths of $\frac{1}{2}$ in. to 6 in. Germination results are shown below in Table LV.—

TABLE LV.—*Showing the Germination of Millet Sown at Various Depths in Heavy Clay Loam in 1908.*

[illegible]

TABLE LV.—*continued.*

Depth of Sowing.	Germination Order and Numbers.												Total Number Germinated.
	October.												
	16	17	18	19	20	21	22	23	24	25	26	27	
$\frac{1}{2}$ in.	1	—	—	—	—	—	—	—	—	—	4	—	14
1 in.	—	—	—	—	—	—	—	—	—	—	—	—	18
$1\frac{1}{2}$ in.	1	—	—	—	—	—	—	—	—	—	—	—	13
2 in.	—	—	—	—	—	—	—	—	—	—	—	—	5
$2\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	7
3 in.	—	—	—	—	—	—	—	—	—	—	—	—	3
$3\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	2
4 in.	1	—	—	—	—	—	—	—	—	—	—	—	6
$4\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	3
5 in.	—	—	—	—	—	—	—	—	—	—	—	—	—
$5\frac{1}{2}$ in.	—	—	—	—	—	—	—	—	—	—	—	—	—
6 in.	—	—	—	—	—	—	—	—	—	—	—	—	—

When dealing with millet sown in light sandy land in 1908 we drew attention to the fact that the very defective germination noted for all depths was to be attributed to poor seed. We have a confirmation of this fact in the equally defective germination in heavy clay loam, in which the highest germination percentage was no more than 36 per cent. for the 1 in. depth.

No details can be given in this case as to harvest results, since all the plants succumbed before summer drought without attaining to maturity.

MILLET IN HEAVY CLAY LOAM IN 1909.

In 1909 fifty grains of millet were sown on October 16th. Details concerning germination are shown below in Table LVI.—

TABLE LVI.—*Showing the Germination of Millet at Various Depths in Heavy Clay Loam in 1909.*

Depth of Sowing.	Germination Order and Numbers.												Total Number Germinated.		
	October.										November.				
	24	25	26	27	28	29	30	31	1	2	3	4			
1 in.	2	4	—	1	1	6	1	—	—	—	—	3	18		
1 in.	9	13	2	—	2	—	1	—	—	—	—	—	27		
1½ in.	2	3	4	3	2	1	—	—	—	1	—	1	17		
2 in.	1	5	4	5	—	—	—	—	1	—	—	—	16		
2½ in.	—	1	—	2	—	1	—	—	—	4	—	—	8		
3 in.	—	—	1	5	2	—	—	—	2	—	—	—	10		
3½ in.	—	—	—	2	—	—	—	—	—	—	1	1	4		
4 in.	—	—	—	3	2	2	—	2	2	1	—	—	7		
4½ in.	—	—	—	—	—	—	—	—	—	—	—	—	—		
5 in.	—	—	—	—	—	—	—	—	1	—	—	—	1		
5½ in.	—	—	—	—	—	—	—	1	—	1	—	—	2		
6 in.	—	—	—	—	—	—	—	1	—	—	—	—	1		

Table LVI. shows the germination percentage of millet sown in heavy clay loam in 1909 again to have been low, although on the whole an improvement on the 1908 figures. We have clear evidence, however, that in soil of this character it is extremely unwise to sow millet much below the lin. limit.

Plants of this series were harvested on February 9th. Full details concerning them are given below in Table LVII.

TABLE LVII.—*Showing Harvest Results of Millet Sown at Various Depths in Heavy Clay Loam in 1909.*

Depth of Sowing.	Plants		Percentage of Germinated Plants Dying	Weight of Plants.	
	Germinated Out of 50.	Matured Out of 50.	Off. %	Total. Ozs.	Individual. Ozs.
$\frac{1}{2}$ in.	18	15	17	124	8.3
1 in.	27	23	15	170	7.4
$1\frac{1}{2}$ in.	17	16	6	114	7.1
2 in.	16	13	19	158	12.2
$2\frac{1}{2}$ in.	8	8	—	64	8.0
3 in.	10	9	10	80	8.9
$3\frac{1}{2}$ in.	4	4	—	28	7.0
4 in.	12	7	42	102	14.6
$4\frac{1}{2}$ in.	—	—	—	—	—
5 in.	1	1	—	24	24.0
$5\frac{1}{2}$ in.	2	2	—	27	13.5
6 in.	1	1	—	12	12.0

Table LVII. shows clearly that the best yields are those obtained for shallow depths of sowing in heavy clay loam, nor at these shallow depths is the percentage of plants dying back after germination very considerable.

SUMMARY OF THE GERMINATION OF MILLET SOWN AT VARIOUS DEPTHS IN HEAVY CLAY LOAM OVER TWO SEASONS.

We summarise below in Table LVIII. the results of these two years' experiments with millet sown in heavy clay loam—

TABLE LVIII.—*Showing Summary of Germination Results, together with Average Germination Percentages, of Millet Sown at Various Depths in Heavy Clay Loam, 1908-09.*

Depth of Sowing.	Numbers Germinated.		Average Germination. Percentage.
	Out of 50.		
	1908.	1909.	
$\frac{1}{2}$ in.	14	18	32
1 in.	18	27	45
$1\frac{1}{2}$ in.	13	17	30
2 in.	5	16	21
$2\frac{1}{2}$ in.	7	8	15
3 in.	3	10	13
$3\frac{1}{2}$ in.	2	4	6
4 in.	6	7	13
$4\frac{1}{2}$ in.	3	—	3
5 in.	—	1	1
$5\frac{1}{2}$ in.	—	2	2
6 in.	—	1	1

Clearly enough, therefore, the deep sowing of millet in heavy clay loam is very much to be deprecated.

The rate of germination of millet in soil of this character may be summarised as follows :—

Millet plants showed above ground—

9 to 26 days when sown	$\frac{1}{2}$ in. deep
9 to 16	1 in. "
9 to 21	1 $\frac{1}{2}$ in. "
10 to 18	2 in. "
11 to 18	2 $\frac{1}{2}$ in. "
13 to 17	3 in. "
13 to 18	3 $\frac{1}{2}$ in. "
14 to 20	4 in. "
?	4 $\frac{1}{2}$ in. "
?	5 in. "
?	5 $\frac{1}{2}$ in. "
?	6 in. "

GENERAL CONCLUSIONS.

We submit below the following general conclusions having reference to our experiments with millet in 1908 and 1909 :—

1. In our experience, which on the subject includes both ordinary field work and purely experimental work, the germinating powers of locally-sold millet seed is generally very poor, notably inferior, for instance, to those of either maize or sorghum.

2. Millet seed must be classed amongst the very small agricultural seed which do not admit of being sown to any very great depth, particularly if the soil be at all heavy.

3. In our view the seeding depth of millet should not exceed 1 $\frac{1}{2}$ in. in light sandy land, whilst normally a 1 in. depth will generally give the best results in light land of this type. In heavy clay land a $\frac{1}{2}$ in. depth might be recommended but for the fact that the surface $\frac{1}{2}$ in. of soil is usually too dry to bring about immediate germination, even in the spring months of the year. We think, however, that in heavy land 1 in. must be considered the extreme limit at which it is safe to sow millet.

4. When sown 1 in. deep the millet plants should show above ground within nine to 20 days after seeding.

DISEASES OF POULTRY.

TROUBLES WHICH BESET THE BREEDER.

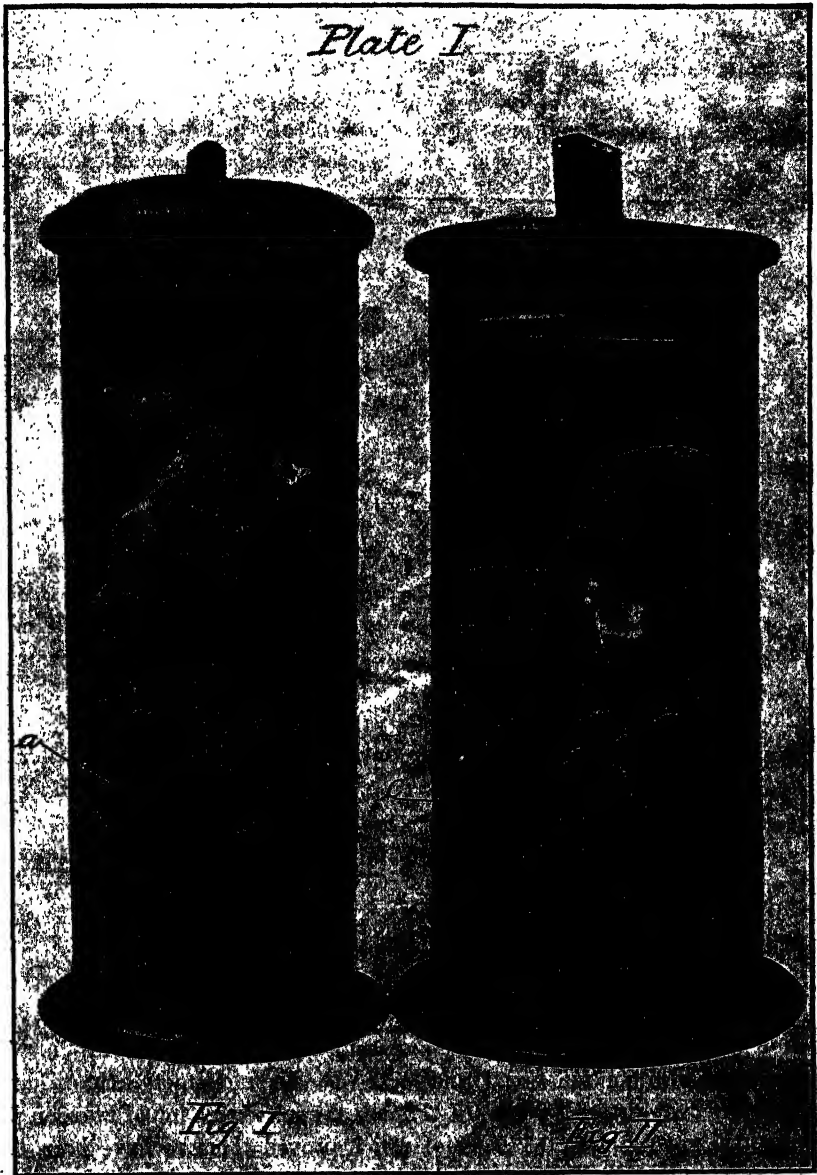
By D. F. LAURIE, Poultry Expert.

During my many years' connection with the department as instructor in poultry-breeding I have emphasized the importance of a sound knowledge of the principles of breeding. It has been frequently impressed upon breeders that in recent times much light has been shed upon what were once obscure or little understood problems in breeding. Nowadays none but the illiterate deny the fact of heredity. A great many of the troubles that beset the poultry-breeder are due to want of knowledge of the laws of breeding, and, of course, of feeding and other matters. I have arranged to contribute a series of illustrated articles explanatory of many troubles and diseases among poultry. In the work of inspection a great many diseased specimens are met with, and for some time I have added to a collection of pathological specimens illustrating many phases of disease. The material will thus be local, and the subject matter will deal with cases not infrequently met with by our breeders. I may here preface my remarks by saying that generally I do not consider there is any abnormal increase in diseases as a whole. A great deal of information upon this matter is within the reach of breeders who are becoming observant. Diseases, &c., are recorded and examined now which at one time passed with little notice.

THE REPRODUCTIVE ORGANS.

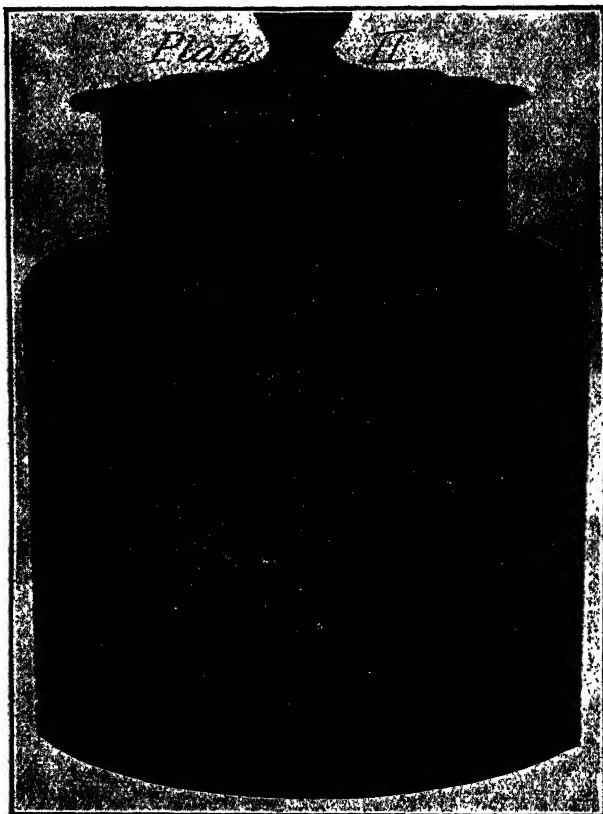
Rupture of the Oviduct due to Impaction and Cessation of Function.—The laying hen, and particularly the pullet, or young hen, is, during her reproductive stages, in a more or less nervous condition. Her every function of life is practically concentrated upon the effort to reproduce her species, and she is in a different state as regards temperature, blood pressure, and nervous equilibrium to that which exists when she is not laying nor about to lay. The rule holds for all creation; various instincts are aroused, and the female, as a rule, seeks quiet and seclusion, and resents, and suffers from undue treatment and publicity. The hen, true to the survival of feral instinct, seeks out secret secluded spots wherein to make her nests, and will, if at liberty, revive many of the habits of her jungle ancestry. The laying hen,

whether in the act or while carrying and maturing eggs from day to day, is in a highly strung nervous condition. The act of laying is due to muscular



contractions which depend upon nerve stimulus. Any sudden disturbance or the worry and excitement, due to change of locality, a journey, or any disturbing influence, as chasing by men and dogs, tend to derange the nervous

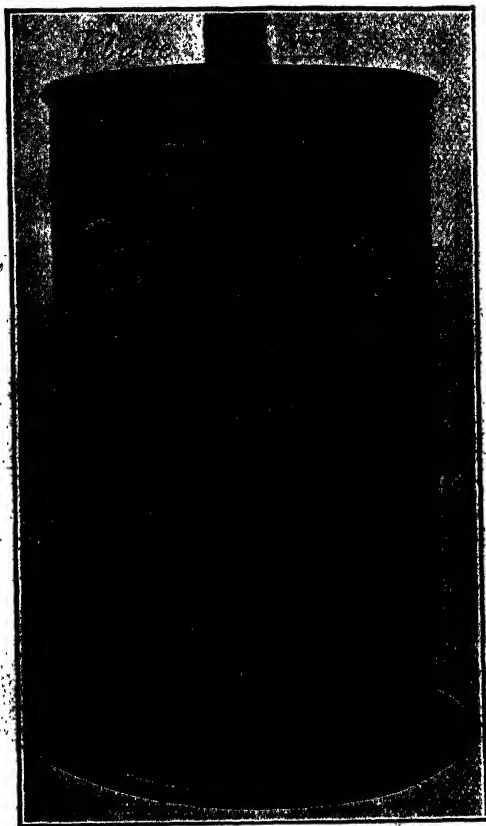
system and may rob the muscles of the stimuli, without which they cannot act. On many occasions during operations, *post mortem* or otherwise, I discovered abnormal conditions which owed their origin in the first place to nervous derangements. Readers may remember that in the report of a former laying competition at the Roseworthy Poultry Station a description was given of a *post-mortem* examination of a hen which was proved never to have laid an egg during the greater part of the test. In this case examination



showed that the oviduct was in a flaccid, non-functional condition. The ovary was also non-functional, and lacked the signs characteristic of having shed any ovules recently. In the abdominal cavity were found two complete eggs, the condition of the shells of which proved them to have been there for many months. The history of this hen showed that she was in a laying condition when sent from Adelaide to Roseworthy. The excitement of the journey and of her new surroundings evidently had the effect of inhibiting the peristaltic muscular contractions of the oviduct while one of these eggs was passing through that organ. Later on another egg passed partly through,

and was completely formed as regards membranes, shell, &c. The subsequent history, as surmised, was that the loss of function in the oviduct was complete, and as there was no trace of any rupture the eggs must have gradually worked their way back to the free end of the oviduct (*ostium*) and thus passed into the abdominal cavity. The oviduct ceased activity, doubtless in sympathy with and due to the cause operating on the oviduct.

PLATE I, Figs. I. and II.—This refers to a case somewhat similar in some respects, but in which there were many interesting features. I noticed that



one of the Black Orpington second season hens in one of the breeding pens at the Roseworthy Poultry Station showed an abnormal abdominal development. She was what breeders call "down behind," but was red in comb and very healthy in general appearance. On a subsequent visit I killed her and made an autopsy. On laying bare the internal organs I was met with a surprising sight—she seemed to be full of eggs, many completely shelled. It was then recalled that at times she had been noticed passing fluid like

egg white, which was sometimes colored, and which would account for the remains of the many broken eggs found within her.

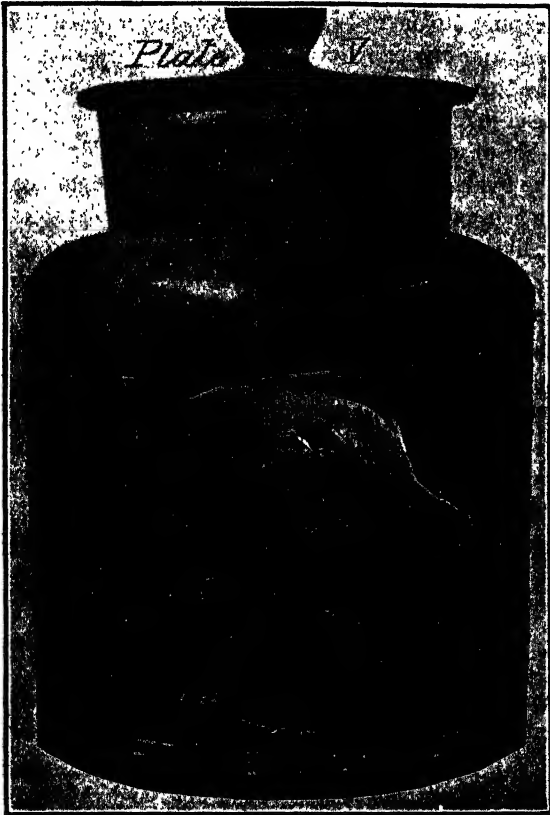
PLATE I., FIG. I.—Shows the oviduct suspended—it was 26in. long and functional except at the uterus portion, where a rupture was found; *a* shows the funnel-shaped free end (*ostium tubæ abdominale*) of the oviduct resting on one of the encysted masses of broken shell (*bb*). This rupture was old, and new tissue had formed round the torn edges, thus making a new



outlet, but into the abdominal cavity. In the uterus portion (where the shell glands are) and towards the closed end I found two encysted bodies (*bb*), which upon examination proved to be conglomerated masses of broken shells. The cause of this is obscure. In all probability the impaction was originally caused by a broken egg, but why so many should subsequently be broken and so form a mass is difficult to explain, unless the hen frequently passed over some object or obstruction which caused frequent breakages of eggs while in utero. The subsequent pressure of eggs on the oviduct caused

the rupture. The encysted mass of shell is as big as an ordinary fist, and each must include the remains of six or more eggs.

PLATE I., FIG. II.—This also refers to the same hen and shows the foreign contents of her abdominal cavity. There are six completely formed eggs with firm shell, tinted, five eggs with membranes, but lacking lime salts deposits (shell), and four other soft eggs, flattened in shapes. The complete and soft-shelled eggs were all oviform and normal. The most surprising fact to my mind was that not only was there no sign of inflammation, nor of any septic symptoms, but that the ovary was in a healthy and most active con-



dition, and maturing and shedding ovules which appeared normal and healthy. The excised ovary is shown at *c* and is seen to contain ovules in various stages of development. It is very evident that active resorption was in progress, but it is doubtful how long the hen could have existed without further troubles due to pressure.

PLATE II.—This shows viscera of a large hen which appeared to have a tumor of some sort. *Post-mortem* examination revealed the interesting fact

that there were three completely formed eggs in the uterine portion of the oviduct, which is clearly shown, and the shape of the eggs can be seen. The duct was highly vascular and inflammation was setting in. Peristaltic action must have ceased and a state of impaction or obstruction was evident. No other abnormal features presented themselves. The ovary in this case was not active, and it is perhaps possible that these three eggs were the last of a series prior to a long period of rest.

PLATE III.—Another physiological state may result from sudden loss of function of the oviduct. The Plate III. shows the greatly distended but ruptured (*post mortem*) oviduct containing two tumeroid masses, which are similar in appearance to many which I have encountered. These masses are semi-solid and were originally incompletely formed eggs (minus calcareous deposit), round which material secreted by the oviduct has gathered. This can be better seen in Plate V.

PLATE IV.—Shows a mass consisting of three similar tumeroid masses severed from the oviduct of an old hen. In this case septic symptoms were present, and the hen was moribund when received. The plate shows discoloration, due very likely to the organisms of putrefaction or to enzyme action, causing chemical dissociation and consequent evidence of sulphur compounds, humins, &c. (*melanins*).

PLATE V.—Shows a section through a tumor of similar constitution. Here, at *a*, *b*, and *c*, can be seen the shapes of three eggs, and round these individually, and round them as a whole, will be seen the laminated succession of deposits of albumen and membranes secreted by the oviduct. The partial resorption of this material and chemical changes result in an appearance similar to that of a hard-boiled egg. There was no effluvium, and the sulphur compounds of the proteins were not in process of decomposition as far as could be judged by smell and appearance. The hen from which this specimen was taken was old and the ovary not functional. The same was the case with hens the subjects of Plates III. and IV.

These plates deal with one abnormal case (I.) and with cases (II., III., IV., and V.) commonly met with in my work, but all primarily due to nervous shock in the first instance. The moral for breeders is to observe the following rules:—

1. Do not harass, worry, nor chase, nor let dogs and children chase, laying hens.
2. Do not send such hens and pullets on a long journey if it can possibly be avoided.
3. Where heavy, inactive, short-legged hens are concerned do not have obstructions which may injure her.

The next article will describe the organs of reproduction in a hen, and the illustrations with explanation will deal with the obscure ovarian cystic formations so often seen.

THE CO-OPERATIVE MOVEMENT IN DENMARK,

ITS GROWTH AND PROGRESS.

The following article on the growth of the co-operative movement in Denmark is taken from *The Journal of the British Board of Agriculture* :—

“ Until the latter half of the last century Denmark was a corn-producing country, but from 30 to 40 years ago various causes combined to ruin this branch of agriculture in the country, and it was then that Danish farmers began to take up dairy-farming. Such success attended this departure that Denmark is now cited as being second in the list of European countries ranked according to wealth per head of the population. The new departure was from the beginning encouraged by the Government, and the judiciously applied State aid is in no small measure responsible for its success.

“ Apart from the geographical and other natural advantages which Denmark enjoys as regards this special branch of the agricultural industry, its success is to be very largely ascribed to the perfection to which the system of co-operation has been brought in the country. In 1890, when the co-operative movement was as yet in its infancy, the butter exported from the country (to take one instance) was calculated at 97,480,000lbs., while in 1905 Denmark exported 186,360,000lbs. of butter. At the same time the number of co-operative dairies had increased from 781 to 1,068, exclusive of some 200 communal dairies.

“DANISH CO-OPERATIVE SYSTEM.

“ The system of co-operation as practised in Denmark may be said to be an adaption of the English Rochdale system. The first step was the foundation of a co-operative supply stores about the middle of last century, and this was followed in 1882 by the first co-operative dairy, which was started in that year by Herr Stilling Andersen at Hjedding. The movement has now developed so far that there is not a single matter of interest to the farmer that has not become the object of co-operation. The motto of co-operation in Denmark may be said to be ‘ Each for all and all for each.’ This applies both to the liability incurred in raising the loan necessary to commence the undertaking, whatever it may be, and to the division of the profits of that undertaking.

" CO-OPERATION AND SMALL HOLDINGS.

" Before dealing with the individual branches of agricultural co-operation in Denmark, it is necessary to give a brief glance at the conditions under which they have come into existence and flourished. A very well-informed Dane, in discussing the subject, stated that, in his opinion, the success of the co-operative movement in Denmark was dependent on the small holdings system, and, conversely, that without co-operation the system of small holdings would be impossible.

" LAND LEGISLATION IN DENMARK.

" The tenure of land in Denmark is, as regards the larger estates, very similar to that in England, and no special notice need be paid to it as concerning the object of this report. As regards small holdings and peasant farms, however, the position is different. All land legislation in Denmark for the past hundred years has tended to the formation of a peasant class *owning small farms*, as against the formation of large estates. Thus, an estate-owner is encouraged to sell small holdings or farms to the peasants. Once a farm is in existence it must either be kept intact with all its buildings upon it, or it may be divided into two or more farms, each to be worked separately, *but it may not be incorporated into another to form one large farm*. Then, too, the State has established a fund to advance money under very easy terms to suitable peasants to enable them to purchase holdings for themselves. The peasant must have saved a certain sum of money (in some cases about 10 per cent. of the purchase-money of the holding—which varies between £170 and £300, including stock—is considered sufficient), and the State advances the rest at 3 per cent. interest, and with great facilities in the matter of repayment, retaining a mortgage on the land. Thanks to beneficial legislation, a great portion of the agricultural population in Denmark own the land they work. There are about 2,117 large estates, 75,320 peasant farms of from 20 to 150 acres, and 68,000 small holdings varying from three to seven acres.

" PROSPERITY OF PEASANT FARMERS AND SMALL HOLDERS.

The peasant farmers and small holders are very prosperous; the latter are paying off the mortgages on their holdings, and it is found that the previous movement of the rural population to the towns has been in a large measure arrested. In this connection it may, too, be mentioned that since the State has offered pecuniary assistance to agricultural laborers to acquire their holdings, there has been a falling off in the number of emigrants.

" ADVANTAGES OF CO-OPERATION TO SMALL AGRICULTURISTS.

" The peasant farmers and small holders, being naturally men of small means, would in many instances have found it very difficult to bring their produce to an advantageous market. By means of co-operation the small

man is able to reach the best market possible. The co-operative dairy of which he is a member buys his milk of him at the market rate, and sells him back at a low price the separated milk on which he feeds his pig. The pig he sells to the co-operative bacon factory at a price determined by the demand of the British market, while his eggs are disposed of to the co-operative egg export association. In this manner he receives as good a price as if he were able to bring his produce himself to Copenhagen; nor do his benefits from co-operation cease there. He obtains all he wants for himself, his family, or his farm from a co-operative supply association, while a similar association insures him.

" CHARACTER OF THE DANISH PEASANT.

" It must not be forgotten that the Danish peasant is a very hard-working man. His hours are generally longer than in England, and his way of life cheaper. He is also very honest. This honesty, and the mutual trust which results from it, may be taken to be the moral foundation of the co-operative movement in Denmark. Without this mutual trust, which is doubtless strengthened very greatly by the fact that, distances being small, most members of a co-operative undertaking are personally known to each other, it is difficult to imagine how the co-operative movement could have grown so rapidly.

" EDUCATION.

" To this innate honesty one must add an excellent education, received in the first instance at the State school, and later at one of the high schools, agricultural colleges, or cottars' schools. These schools, by bringing young men and women of the agricultural classes together, are undoubtedly not without their value in preparing them for working along co-operative lines.

" These observations may, perhaps, be considered beside the mark, but the extraordinary success which has attended the introduction of co-operation into Danish agricultural life cannot be ascribed solely to geographical formation and favorable legislation.

" CO-OPERATIVE DAIRIES.

" The first co-operative dairy in Denmark was founded in 1882 in Jutland, and the movement almost immediately became general. So quickly, indeed, did co-operative dairies spring up over the whole country that in 1903, which, unless otherwise stated, will be the year of all figures given in this report, there were some 1,100 such dairies.

" EXTENT OF THE MOVEMENT.

" A better idea of the extent of the movement will be gathered from the fact that there are 174,742 farms with cows in Denmark; of these 143,863, or 82.3 per cent., are in the hands of men who are members of a co-operative

dairy. (N.B.—As these figures date from 1903 it may safely be taken that there has been some increase since that year, and it may be added that when the statistics were taken some 4,800 of the circulars sent out were returned either not filled up or unsatisfactorily filled up, so that these figures represent a minimum, not a maximum.) Again, of the 1,066,698 cows in Denmark, 862,986, or 80.9 per cent., are owned by farmers who are members of co-operative dairies, while of the remainder about 10 per cent. deliver their milk to joint dairies, so that about nine-tenths of the milk produced in the country is dealt with in dairies working on the principle of association.

"PARTICIPATION OF DIFFERENT CLASSES.

"At this point it is of interest to note the manner in which the different classes of farms participate in this movement. Of the very small farms only 3.1 per cent. are members of a co-operative dairy, but at the same time the milk of 58 per cent. of all the cows owned by this class of peasant farmer is delivered to some such dairy. In other words, most of these farmers are too small to possess a cow, while more than half of those that do are members of a co-operative dairy.

"The next class most weakly interested in the co-operative dairy movement is that of the large farmers—in many cases the great landowners—of whom only 43.5 per cent. are members of a co-operative dairy. In this case the reason is to be found in the fact that they are very often owners of dairies in which they deal with their own milk—in some few cases even adding to it by buying milk from their smaller neighbors.

"Between these two extremes about 85 per cent. of all the farmers are members of a co-operative dairy, *i.e.*, about 85 per cent. of the milk produced in the country is sold to a co-operative institution.

"BENEFIT OF CO-OPERATIVE DAIRIES TO SMALLER FARMERS.

"The immense benefit of this movement to the smaller farmers can hardly be overestimated. It was formerly practically impossible for the smaller man to deal with the milk produced on his farm in such a manner as to secure a high and uniform standard of butter and cheese. He had to rely on the local market for the sale of his produce, and there was besides a considerable wastage of by-products. Under the co-operative system—which owes its success largely to the introduction of the centrifugal separators, which render it possible to deal with large quantities of milk expeditiously—the small farmer is assured of the best market obtainable, has more time for properly attending to his farm and stock, is able to buy back at a very low figure by-products, such as separated milk, which he may need for his own purposes; and, most important of all, he has won the reliance of the market on the high and uniform standard of his produce.

"MANAGEMENT OF A CO-OPERATIVE CREAMERY.

"The society having been formed, an executive committee is elected, it in turn electing its chairman, vice-chairman, and treasurer. The elections hold for a year. The committee appoints a manager, who is generally paid a lump sum yearly, out of which he has to pay the employes and himself. This system has many obvious disadvantages, and it is not unlikely that it will in time be changed. The manager, besides engaging the employes and supervising the working of the dairy, has to keep the books and generally control the whole business of the undertaking.

"FITTINGS OF THE CREAMERY.

"The creamery is almost invariably supplied with steam-driven centrifugal machines, and has one or more separators and pasteurisers, according to the amount of milk dealt with. The machines generally drive an electric plant and a cooking apparatus. All utensils are very carefully cleaned, as are the milk cans before their return to the farmer. Most of the machines and utensils appear to be of Danish manufacture, but English and German marks are sometimes seen. Great attention is paid to cleanliness in every department, and the farmers also are required to observe a very high standard in this respect.

"CARTAGE OF MILK.

"The cartage of milk is generally done by the dairy society, who, in most cases, let it out to a contractor. The dairy charges the farmer so much per hundred pounds of milk. These charges vary from three to ten öre (rather less than $\frac{1}{2}$ d. to about $1\frac{1}{2}$ d.). The farmers are bound to deliver the milk on the main road, where it is collected by the carrier. It is a common sight in Denmark to see two or three milk cans standing by the side of the road for the carrier to pick up. These cans hold a hundred pounds of milk, and are supplied by the dairy.

"TREATMENT OF MILK.

"The milk is weighed on receipt at the creamery and entered to the subscriber's account. Payment is made according to the amount of butter-fat contained in the milk. Every dairy makes regular tests of the milk supplied by its subscribers, and any falling below a certain standard is immediately notified to him, and if the fault is not remedied his milk is refused. Great care is also exercised to prevent milk from any diseased animals being sent to the creamery. Some co-operative societies even go the length of undertaking partially to indemnify a subscriber who suspects one or more of his cows of being tuberculous, and, in consequence, does not send his milk to the creamery.

"FORMATION OF A CO-OPERATIVE DAIRY.

"The capital required to start an average Danish creamery varies from \$1,200 to £1,500. This sum, which would cover everything, is advanced:

to the co-operative society by a bank or other institution having money to invest. The farmers forming the society pledge themselves, each according to the number of cows on his farm, to be liable for this loan. The bank holds a mortgage on the factory or creamery, and has further right of recovery against each farmer in proportion to the extent of his guarantee. The farmer undertakes to sell *all* the milk produced on his farm for a certain number of years—the period varies in the different societies from seven to 20 years—to the co-operative dairy, and to observe a certain number of rules as to feeding of cows, treatment of milk, utensils, and so on. Infringements of these rules are punishable by fine, but such cases are of very rare occurrence. Each member signs an agreement drawn up in the above sense, binding himself and his farm to the observance of the rules therein contained. It thus follows that if a farm changes hands during the period for which the farmer has become a guarantor, the liability rests on the new owner.

"NUMBER OF CREAMERIES IN DENMARK IN 1908.

The figures for the year 1908 show that there were in all 1,345 creameries in Denmark at the beginning of the year. Of this number 33 belonged to private persons (Heeresgaardsmejerier), 211 were communal dairies (Faellesmejerier), and the remainder, 1,101, were co-operative dairies.

"ASSOCIATIONS OF CO-OPERATIVE DAIRIES IN 1908.

The greater number of these dairies are again associated in various ways. The most comprehensive of these associations is, perhaps, the Committee of the Federated Danish Dairy Associations (Desamyrkende Danske Mejeri-forenings Forretningsudvalg). This committee, which was founded in 1899, consists of the Presidents of the Associated Dairies' Unions of Jutland, of Zealand-Lolland-Falster, and of the Funen Dairies' Association, in other words, of the dairy associations of the whole of Denmark proper. Its object is to consider the proposals to be laid before the yearly meetings of the associations, and to endeavor to concentrate and unite the efforts of the various societies in all matters connected with dairy association. The State, in the yearly budget for 1907-8, granted the committee Kr. 4,000 (£222) towards the expenses of butter exhibitions, and Kr. 1,000 (£55) for the wages of a consultant in the control of the dairies.

Taking next the local associations of dairies, the Presidents of which form the committee above-mentioned, we find the Associated Dairies' Union of Jutland, composed of all the 13 minor dairy associations of the peninsula, who again have as members 504 dairies. The object of this association is to form a connecting link between the various dairy associations of Jutland, and in general to further the interests of the dairy industry by holding butter competitions, exhibitions, giving advice, and so on. Each dairy association pays a yearly contribution calculated upon the amount of milk dealt with.

(in the year 1907-8 this contribution was Kr. 3 (3s. 4d.) per million pounds of milk), and each association sends one representative for each seven dairies of the association. The Union has a yearly budget of Kr. 14,000 (£777). The subscriptions amount to Kr. 6,000 (£333). The State contributed Kr. 6,650 (£369), which was expended in securing the services of an expert as consultant, in arranging butter exhibitions, and generally in forwarding the production of milk and butter.

"The Associated Dairies' Union of Zealand and Lolland-Falster has a membership of five dairy associations—or in all 140 dairies. The Dairy Association of Funen is composed of 145 dairies. Both these associations have generally the same object as the Jutland Union above mentioned.

"ELECTION OF THE BOARDS OF CO-OPERATIVE INSTITUTIONS.

"As a general rule all associations in Denmark coming within the scope of co-operation are controlled by a committee and chairman elected for different lengths of time—usually for a year. It has been found that it is better to keep such committees separate, and as a consequence we find a number of such boards—in the smaller districts and villages often composed of the same men—directing different undertakings in the various branches of agricultural co-operation, and working side by side throughout the land.

"The contributions to the dairy associations are generally based on the amount of milk dealt with; in the case of the dairies themselves sometimes on the number of cows belonging to the subscriber, sometimes on the amount of milk; while in the case of bacon factories the subscription is, as a rule, regulated by the number of hogs slaughtered, the subscriber in this latter case generally guaranteeing a fixed sum.

"LARGER PRODUCT OF THE COWS ON SMALLER FARMS.

"The average yield of milk from cows on farms of the two smallest classes is considerably higher than that on larger farms. This is probably largely due to the fact that on the smaller farms the number of cows kept is proportionately fewer, and the farmer is consequently able to attend to them personally and more thoroughly than is possible on a larger scale.

"CONTROL SOCIETIES.

"In 1895 a new departure was made in agricultural associations, by the formation of the first Control Society (Kontrollforening); the number had increased to 479 in 1907, with an aggregate membership of about 12,000. These societies are aided by the State, the subvention in 1906-7 being Kr. 120,000 (£6,666).

"FORMATION OF CONTROL SOCIETIES.

"Though not actually co-operative undertakings, these societies are formed on co-operative lines by the farmers in various districts. A membership

of eight is necessary before the society can receive State aid, though this aid may be refused by the Minister of Agriculture in certain circumstances.

" OBJECT OF CONTROL SOCIETIES.

" The principal aim of these societies is to improve the milk-producing capacities of the breed of cattle in Denmark. With this object an expert is appointed as controller (it is calculated that one controller can look after about 1,000 cows). This officer travels from one farm to another in his district and gives the farmers advice as to the cows they should select for breeding purposes, and the bulls to which it would be best to put them. The farmer has to keep a record of the weight of milk yielded by each cow, and of the butter-fat contained therein, together with details as to the amount and nature of the fodder supplied to the cow. By this means the controller is able to advise as to the profitableness of the animal. The practice of breeding only from such cows as are good milkers is said to be tending towards the production of a breed possessing unusually developed capacities in this direction.

" Beside the main object of improving the breed of cattle, the controller also gives advice on other branches of agricultural industry, such as the pigs, roots, &c. He also keeps duplicate account books for each farm, being both auditor and adviser to the farmer.

" CO-OPERATIVE BACON-CURING FACTORIES.

" Second only in importance to the dairying industry in Danish agricultural life is the bacon-curing industry. In 1887 the import of Danish pigs in a living state into Germany was prohibited, and the Danish farmer saw himself obliged to look for another market. One or two old-established firms in Copenhagen had for some years been dealing with the British market in salted bacon, and hence the first inclination was towards Great Britain. These firms were private concerns, and used the opportune excess of supply over demand to reduce the price given to the Danish farmers for their pigs, while maintaining to a very large extent the price to their customers in London. This state of things was eminently unsatisfactory to the farmer, who, having the success of the recently started co-operative dairies before his eyes, decided to experiment in co-operation in this branch of agriculture also, and the first co-operative pig-killing and bacon-curing factory in Denmark was founded at Horsens in 1888. A certain amount of difficulty was experienced at first, the established private firms naturally offering much opposition, and the experience gained in co-operative dairying being only to a slight degree applicable to this new departure.

" GROWTH OF THE MOVEMENT.

" Despite various obstacles, the success of the movement was assured from the beginning. Eight new co-operative factories were established in the

second year of the movement, and the number has grown yearly since. The number of co-operative pig-killing and bacon-curing factories in 1908 was 36, with a membership of about 95,000. (Besides these co-operative factories there were 24 private firms, so that the total number of enterprises in this branch of the industry was 60.)

" CO-OPERATIVE PIG-KILLING AND BACON-CURING FACTORIES.

" The constitution of a co-operative pig-killing and bacon-curing factory is, *mutatis mutandis*, materially the same as that of a co-operative dairy. The area over which the members of a co-operative slaughterery are scattered is naturally larger than that covered by a dairy. The consignments to the factory are neither daily nor in small quantities, as in the case of dairies, but at longer intervals and in larger quantities. Again, the perishable nature of milk necessarily limits the distance over which it can be transported, while with the live pig this is not the case. The risks of transport are borne by the factory once the pig has been consigned; moreover, the factory bears the cost of transport for such pigs as are sent by train, so that all pigs, whether from far or near, arrive at the factory at an equal minimum of cost to the farmer.

" The money for erecting the factories was raised by loans, as in the case of the dairies, the guarantee being in this case also for a certain number of years, generally five, seven, or ten. In most cases the original loans have already been paid off, and the factories are owned by the members themselves. The members bind themselves to deliver all their pigs to the factory (generally with the exception of the sows and hogs for breeding purposes and young pigs under a certain weight). They may, however, sell to a fellow-member, upon whom the obligation towards the factory devolves. Special rules are made as to the admittance of new members subsequent to the foundation of the factory.

" The members elect their committee, which in turn elects its chairman and vice-chairman, and appoints a director of the factory, and in some cases certain other officials. The director manages the factory under the control of the committee.

" ASSOCIATED DANISH CO-OPERATIVE PIG SLAUGHTERIES.

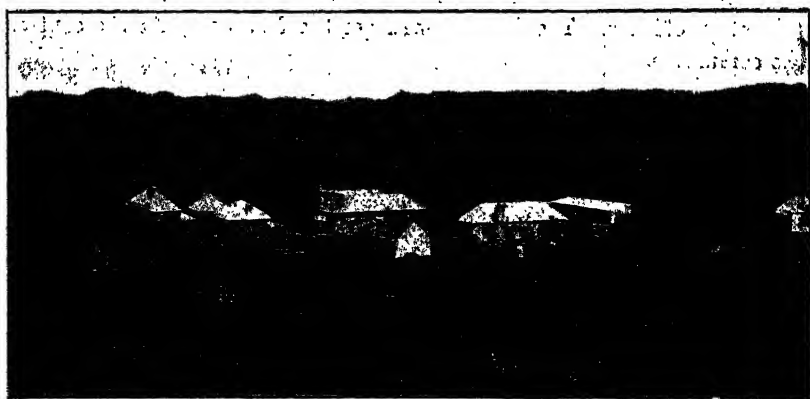
" This association (De Samvirkende Danske Andels-Svinelagterier) was founded in 1897, and 33 out of 36 co-operative slaughteries in Denmark belong to it. It consists of members of the committees of all the associated factories, who elect a committee of five of their members, who stay in office for two years, and of two factory directors, who hold office for a year. The expenses of the association are divided among the associated factories in proportion to the number of pigs they have slaughtered, and varies from one to two öre per pig—in all about Kr. 15,000 (\$833.)

"The objects of this association are to represent the interests of the industry as regards legislation, to secure the best information as to transport of and demand for slaughterhouse products, to work for the improvement of Danish bacon by affording the assistance of scientific consultants, &c., and to promote rational pig-breeding. (There are other associations for the improvement of the various breeds of pigs, some of which are assisted by the Government, but which are not co-operative in their constitution.)

"A very important function of this association is 'to diffuse immediately the latest intelligence regarding the bacon industry among those concerned.' The endeavor to introduce a common quotation of prices for bacon produced in Denmark has only met with partial success up to the present. The abattoirs of Jutland and Funen have established a board which, on the receipt of bi-weekly despatches from England, fixes the price as far as these abattoirs themselves are concerned. The Zealand and Lolland-Falster markets are, however, somewhat influenced by the neighborhood of Copenhagen, and it has hitherto been found impossible to establish a general quotation for the whole country. The association, however, keeps its members informed of the state of the market and of the number of pigs slaughtered in Denmark and Ireland, so that a very good idea of the prices can be formed by the factory directors.

"The action of the association in having a scientific veterinary expert at the disposal of its members (the Government have made a grant of Kr. 2,000 (£111) yearly towards the expenses of this expert) has contributed largely to the success of the Danish bacon industry. The Agricultural High School has also placed its laboratory at the disposal of the association for purposes of experiment.

"It is also due to the association that the veterinary control of exported meat, which was regulated by the Law of July 29th, 1903, was recently revised, and that the standard was so raised that foreign customers of Denmark can be certain that they receive nothing but absolutely sound meat."



REGISTERED PEDIGREE COWS.

TESTING THE ANNUAL PRODUCTION.

By W. M. SINGLETON, in the *New Zealand Journal of Agriculture*.

One of the greatest accomplishments of modern times is the advancement made in the productive character of dairy stock, as evidenced in the cows which are the world's greatest producers of milk and butter-fat. Whether this success of the breeder has been obtained by means of providing suitable environment for the cow and her ancestry, or whether advantage has been taken of certain mutations which have appeared as suggested by the Mendelian theory, matters not. Certain families possessing special dairy qualities have been built up by taking advantage of the prepotency of an animal possessing such qualities in a marked degree and capable of transmitting them to its offspring. It is now generally known that among all the dairy breeds certain families stand out as possessing the best qualities of the breed in a special degree.

Those dairy cattle known as "purebreds" are, as a class, generally considered to possess certain fairly well-fixed and desirable qualities, which the keeping of the breed in a pure state tends, when accompanied by judicious selection, to propagate and strengthen. The power of transmitting these qualities is thereby intensified, and the breed made more valuable so long as these qualities transmitted have a monetary value.

As factory dairying extends, as land values increase, and as more intensive dairying becomes necessary, the monetary value of the dairy cow has relegated the æsthetic consideration to the background, and now "handsome is as handsome does," and the cow prized most highly is the one that "delivers the goods" and has this propensity so fixed in her through inheritance from a long line of ancestors of the one type that, according to the law of chance, she is likely to transmit the same desirable qualities to her offspring. And while this quality is prized so highly in the dairy cow, even from the view-point of offspring alone, it must be remembered that the cow's offspring will, each year, number usually not more than one, whereas the male may be parent of many times this number. How much more important is it, therefore, that the dairyman should be positive that the head of his dairy herd has by inheritance received those dairy qualities which the herd-owner is striving to fix in his herd!

These dairy qualities are now very much abbreviated, and may be summed up as "the ability to get offspring which, if females, will produce a large

quantity of milk and butter-fat economically." At one period of the development of our dairy herds the numbers of breeders who might excel according to the then standards was more or less restricted to those who had a special endowment or natural aptitude along that line. In these later days, when the productive capacity of the dairy cow is considered of premier importance in successful dairying, the field is enlarged, and a lover of dairy animals who is gifted with fair judgment and energy, a kindly nature and infinite patience, may, by using the scales and fat-test to provide him with exact data, make a success of dairy-farming. This door has been opened to the greater number very largely through testing and recording of the yields of purebred cows, and by the records of purebred bulls, as seen in the number of their daughters which have distinguished themselves in this record of yields or performance. By consulting this record of purebred cows, the beginner in the older dairy countries can for himself select dairy stock from those families of which the females are heavy milk and butter-fat producers. The prospective dairyman can ascertain whether the bulls of any particular family are transmitting enhanced milking qualities to their offspring, for it is only through the good records of his daughters that a bull's name is admitted to the registry. With such information at his disposal even the uninitiated may make an intelligent selection of good dairy stock. As the associations of the various breeders of dairy stock admit only purebred males and females to their Record of Performance and Advanced Registry, the security which these records offer the purchaser is certainly valuable.

RECORDS OF PERFORMANCE OR ADVANCED REGISTRY.

Official records were not instituted until some considerable time after the herd-books were established. As the numbers of purebred dairy stock increased and competition became keener, the records of performance came to the fore, and control of these records was taken up by the breeders' associations for each breed. It then became quite fashionable for breeders with long purses to make a hobby of rearing record-breaking dairy cows and heifers, and the number of records which have been made and broken is surprising. The development in the dairy stock necessary to keep pace with this record-breaking line of work has been equally amazing; but, while these extremely high records are interesting as showing what the possibilities of some dairy cows are, they are not so necessary from the view-point of the practical dairyman or practical breeder.

For some time the short tests were all that were demanded. Official one-day, two-day, seven-day, or thirty-day tests were considered quite sufficient to indicate the productive capacity of the purebred dairy cow; and many breeders affirm that in the interests of the dairy cow's constitution she should not be kept up to record-breaking pitch throughout an entire

lactation period. While many agree with this line of argument, they are not satisfied to accept the record of a seven-day test as a true indication of a cow's producing capacity for the lactation period. Many cows may milk exceptionally well for a time, but may not be possessors of that all-important quality known as "persistency." The tendency amongst practical dairy-men who are breeding for yearly returns, as well as with the object of selling stud stock, seems to be more along the line of discarding the short-period official tests and extending the tests to take into consideration the cow's full milking period. This class of testing is likely to popularise itself, for, while the dairy cows are not expected to break records, they are under this system expected to do fairly good work throughout the whole milking period, and the figures indicating the cow's production in this manner are much more intelligible to the average dairyman, and at the same time are a more faithful indication to the dairyman of the cow's comparative worth.

The breeders of Holstein-Friesian cattle claim the credit of being the pioneers in connection with the taking of advanced registry official records, while the breeders of the Guernsey claim to be the first to adopt semi-official records for the whole lactation period. The various associations of breeders have accepted this style of record, while at the same time many continue the official record for the short period.

SEMI-OFFICIAL RECORDS.

In the making of the short-period official records the supervisor or testing officer (who is usually an appointee of an experimental station or an Agricultural Department) remains at the farm during the time of such test. He weighs and samples for testing each and every milking, and the yield for the period is figured accordingly. While this is necessary for short tests, it is not so necessary for the test of the whole period. In this semi-official test for the full lactation period the owner is required to weigh, or cause to be weighed, the milk of the cow for each and every milking, and to keep a record of the same. A record of these weights must be supplied each month, and at the end of the lactation period the yearly record must be forwarded by the owners, and must be accompanied by an affidavit sworn before a justice of the peace or notary public declaring the weights to be accurate. The Government officer in charge of the testing is expected to visit the farm once a month for about two days. He is to weigh the milk during his visit and to compare it with previous weights, and take samples for testing for fat. The production of fat for the month is figured by taking the weight of milk for the month as found by the farmers and figuring this at the test found by the Government officer. The lactation period must not extend over 365 days, and each cow must drop a calf within, say, fifteen months from the time her test commenced.

Cows are classed as "two-year-olds," "three-year-olds," "four-year-olds," and "mature cows." Unless an animal produces up to a certain minimum of milk and butter-fat stated as the standard for her class in the semi-official test, she is not admitted to the record of merit. These standards vary with different breeds, but are usually within the following limits:—

	Maximum.		Minimum.	
	Pounds.	Pounds.	Pounds.	Pounds.
Two-year-olds	7,500	255	5,500	198
Three-year-olds	8,500	289	6,500	234
Four-year-olds	9,500	323	7,500	270
Mature cows	10,500	357	8,500	306

It is suggested that the time is opportune in New Zealand when semi-official testing might be commenced with profit to the dairying communities of this country and to the breeders of purebred dairy stock. Dairymen about to purchase purebred bulls will pay more for those descended from ancestry of known merit. The extra price will more than repay the cost of taking the weight of milk daily. A semi-official record of a cow for one year may be legitimately quoted by the breeders when selling any progeny of this cow; and the one season's testing may influence very materially the price of some seven or eight sons and daughters, not to mention the influence on animals whose relationship is farther removed.

To the dairymen of our Dominion who are endeavoring to improve their herds such records would be invaluable. At present many dairy-farmers desire to get purebred sires from known good milking strains, but while many purebred sires are offering, little is known of their capacity to get good milk-producing progeny. For supplying this knowledge, semi-official records of the bull's dam and grandams are necessary, and their absence constitutes the "missing link" in New Zealand breeding of high-producing dairy stock. The testing of the yield production of the individual cows which constitute our ordinary crossbred herds is extending, and is creating a demand for purebred sires; but to an equal extent this herd-testing is creating a demand for the milk and butter-fat records of the sires of such dam and grandams. It is only by the use of sires whose quality is assured by such records that the most intelligent improvement can be made in our dairy herds. The time is not far distant when our most progressive dairymen will, when purchasing a head for their dairy herd, demand not only a pedigree, but records such as described above.

DISEASES OF FARM ANIMALS.

By OFFICERS OF THE STOCK DEPARTMENT.

THE NERVOUS SYSTEM.

(Continued from page 510.)

Nervous diseases are generally spoken of as fits or staggers, and their differential diagnosis is entirely beyond the skill of the stockowner; in fact, it severely taxes that of the expert veterinary surgeon, for the brain and spinal cord and the intricate network of nerves associated with these central organs are so delicately constructed and so marvellously interbalanced that the relationship of cause and effect requires minute investigation and most careful treatment.

APOPLEXY.

A common disease affecting the nervous system is apoplexy, which is generally caused by over-fulness of the blood-vessels of the nervous system, especially those of the brain, and causes the animal to lose all sensation until the pressure is removed. The disease is dangerous, as if an animal is attacked while at work the sudden fall will upset a team, or cause a nasty accident if the sufferer is a single horse in the shafts. The attack is sudden; the difficult breathing—stertor, as it is called—and the blood-shot appearance of the eye, accompanied by more or less blindness, are the principal symptoms.

Failing veterinary assistance, the pressure may be most quickly relieved by bleeding at the neck vein, the jugular.

The symptoms of sunstroke and heat apoplexy are similar to those of pressure apoplexy, but one knows by the heat of the day or the exposure to the sun, combined with exhaustion from work, that the attack has been brought on by external climatic conditions. Bleeding, enemas to empty the bowels, ice or cold water to the poll and spine, good shade, and plenty of fresh air are the means to adopt to bring about relief.

The mare is sometimes attacked with a form of apoplexy after foaling, caused by the sudden readjustment of the circulation after birth. In such a case quietness and laxative food and medicine are the best treatment.

In old animals a diseased condition of the arteries of the brain, called atheroma, brings on a fit of apoplexy, which very often proves fatal, and if it does not, a bullet in the brain will most probably be the best treatment and save a good deal of unremunerative trouble and expense.

MAD STAGGERS.

Actual inflammation of the brain and the earlier condition of congestion of that organ, or of the fine coats which surround and protect it (the meninges), are manifested by what is commonly spoken of as mad staggers—a name sufficiently descriptive to render a detailed exposition of the symptoms unnecessary.

The frantic plunging of the animal or the inert immobility of its heavy body render treatment difficult, and in most cases it will resolve itself into leaving the animal alone in a shady and protected spot where it cannot do itself harm in its struggles, and doses of laxatives, such as Epsom salts, in the drinking water. If more active measures are taken the greatest care must be exercised to avoid accidents, which otherwise will quickly arise from the animal's rapid and ungoverned movements. In all affections of the nervous system it is most desirable to keep the bowels working freely, as the pressure of blood in the vessels is thus relieved.

Inflammation of the meninges, or coats of the brain and spinal cord, when acute, is generally associated with the foregoing, and causes paralysis by the pressure produced by the amount of inflammatory fluid exuded between the meninges. In chronic cases this often becomes solid, and then the continuous pressure of some particular part of the brain or cord brings about a partial paralysis affecting those parts which are innervated or controlled by the fibres which come from the parts of the nervous organs affected. This form of paralysis often results in permanent loss of power in one or more limbs, and if it yields to treatment it does so but slowly, and in the cases of the horse if recovery is not complete a lameness persists which renders the treatment unsatisfactory. External warmth is of great use in this disease, which is often due to accident or to the presence of worms or their eggs in the vessels of the meninges.

TOXÆMIC PARALYSIS.

It is quite a different disease to that known as cerebro-spinal meningitis, a better name for which would be toxæmic paralysis—a disease unfortunately prevalent in South Australian horses. There may be no premonitory symptoms, the horse being noticed to be stiff, giddy, or staggering; often the lips swell and there is a profuse flow of saliva, which is ropy, like thin starch. The eyelids are filled with tears and their vessels are full of blood, as are those of the lining of the nose, upon which little blood spots may often be noticed. In the early stages the breathing and pulse are not disturbed, but as the disease advances they become more rapid, and irregular and intermittent as death approaches. The thermometer does not indicate fever.

The symptoms of paralysis come on suddenly. There is a total inability to move the muscles of the body and limbs; the horse falls prostrate to the ground, and is unable to rise without assistance. In the majority of cases

there is difficulty in swallowing, which, in severe cases, is very marked indeed, and causes the horse to present a very loathsome and pitiful appearance. He rests his head on the nearest object, feed-box, bucket, &c., and endeavors to masticate food or drink water; the tongue lolls out, the lips lop down, and a thick whitish, ropy discharge exudes from the eyes and nostrils. In most cases where the animals are not placed in slings death ensues in from 12 to 36 hours. Rapid wasting takes place, and horses in good condition when attacked with this disease very quickly become emaciated. The bowels may not work freely and the urine is reduced in quantity. Before death the horse loses consciousness, and all the functions of the body fail.

Treatment is difficult and often unsatisfactory. Hyposulphite of soda is useful when its administration can be managed, and the soluble preparations of iodine are most likely to help, but expert veterinary aid must be sought if recovery is to be expected.

CONVULSIONS.

Coma, or unconsciousness, frequently accompanies injuries to the brain, whether these are external or internal, and little can be done beyond keeping the bowels open and the head cold. Convulsions, fits, or epilepsy generally arise from irritation of the nerves, due in many cases, and most often in young horses, to worms or teething, and the removal of the irritating causes generally results in a cessation of fits. As preventives the bowels should be kept active, the diet spare and succulent, and the animal so placed that it will not injure itself while the fit is on.

STRINGHALT AND SHIVERING.

Stringhalt and shivering are nervous diseases closely allied, and manifested by the inability of the animal to use control of the nerve supply of the limbs, generally the hind ones. In stringhalt the animal proceeds with a peculiar jerky action of one or other of the hind legs, which peculiarity, in mild cases, wears off after a step or two, while in severe cases it increases as the animal progresses.

Shivering is aptly called in French *immobilité* and affects the hind quarters, so that the animal is unable to back a load, often, indeed, to be backed alone, one of the most noticeable symptoms being a curious shivering of the tail, from which the disease is named. These diseases are due to obscure nerve troubles arising from a variety of causes, of which debilitating illnesses, hereditary disposition, and sometimes wandering worms in the coats or substance of the spinal cord are the chief.

Treatment, beyond general tonics and nerve restorers, is not of much use, and animals affected with these diseases should not be used for breeding, although sometimes it may pay to keep them for straightforward work,

OTHER NERVOUS DISEASES.

Fainting occurs in some animals from over-exertion. It should be treated by allowing the patient to lie quiet, freed from tight harness or girths, till recovery commences, when ice or cold water to the head will refresh and reinvigorate it. Ammonia may be held to the animal's nose and when it is sufficiently recovered as to be able to swallow, beer or spirits may be given with advantage.

One often hears of mad, sleepy, and grass staggers. The first is the delirium due to inflammation of the brain; the second is an indefinite term, which applies equally to coma and various forms of congestive paralysis; while the third is often a popular name for the toxæmic paralysis, already alluded to.

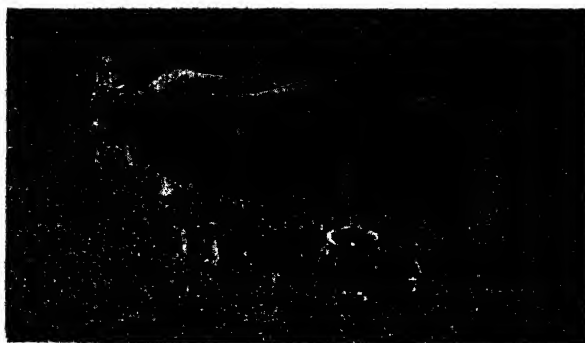
Lightning shock sometimes induces a form of paralysis or staggers, which generally passes off in a few hours or in a day or two.

Hydatids in the brain and the larvæ of various flies in the upper air passages often cause symptoms like mad staggers in the horse, and it requires both skill and experience to be able to locate them, and then to adopt methods to bring about their removal. If they are suspected to be present a veterinary surgeon should be consulted at once.

Some nervous mares suffer from hysteria, and such cases are best treated by spaying or removal of the ovaries, but it is well to try the effect of getting a foal from them first, as frequently this calms them down.

Various other forms of paralysis result from injuries to nerves, but their treatment is as a rule too expensive and tedious to be profitable. In these cases it is but seldom that a complete cure can be looked for, and anything short of this is not worth bothering about in the horse, where lameness is a bar to utility.

(To be continued.)



JERSEY COWS.

THE DAIRY.

FEEDING OF THE DAIRY COW.

By P. H. SUTER, Dairy Expert.

The feeding of dairy stock does not receive sufficiently serious consideration by dairymen, the quantity and quality of the food supplied being largely left to chance.

In the flush of the spring months there is an abundance of nutritious, milk-making pasture, but this is quickly followed up by hot and dry summer months, when the natural pastures are not in a condition whereby a cow can continue to make milk to profit. Again, many cattle are obliged to exist upon stubble lands and bare paddocks where there is little food obtainable and that, as a rule, lacking succulence and sufficient nutriment to maintain the system, much less to allow of making milk. This neglect to provide for the feeding of dairy cattle is unquestionably the weakest spot in Australian dairy practice. So far as South Australia is concerned there are few outside the metropolitan area who make that food provision so essential to successful dairying.

If dairying practice is to be carried on during the midsummer and winter, then special and careful provision must be made. In summer much could be done where rich flats and a good water supply exist. In such places lucerne, one of the best if not the king of dairy fodders, could be grown; and maize, sorghum, wheat, and peas could be produced for siloing, thus providing a certain supply during the periods of scarcity.

For winter feed those keeping cows should give some attention to the growing of mangolds; and oats and barley, if put in early, will also be found to give good results when fed to cows. Thousand-headed kale, Chou Moellier are also useful fodder crops to grow.

In my opinion every effort should be made to induce dairymen to evince a keener interest in those two most important factors to success in dairying practice, viz., breeding and feeding.

With reference to breeding, it should be made possible for dairymen to secure the services of the most suitable bulls at a reasonable cost.

In regard to effecting improvement in production, I am of opinion that such could be looked for early if better provision were made to judiciously

feed our herds. I therefore think demonstration work should be arranged to be carried out in various centres, where a progressive farmer would agree to grow the crops recommended on his farm. The seed and manure should be supplied by the Government free of cost, and all necessary records kept free of cost by the dairymen of the food fed and the results. If thought advisable the Government might also consider the question of erecting movable silos on such farms, and these, if desired, might be purchased by the farmer on reasonable terms.

Finally, I would point out that if there is to be a sound, permanent improvement in the dairying industry there must be a keener interest taken in the business. Haphazard methods must pass away, more intelligence must be evinced in breeding and feeding, truer loyalty must obtain in regard to the co-operative system, and farmers must more fully recognise their responsibilities in the production of good dairy produce.



POULTRY NOTES.

By D. F. LAURIE, Poultry Expert.

OPERATIONS FOR JANUARY.

Good resolutions are generally made during this month. It is hoped that with regard to matters connected with poultry-breeding many good resolutions will be made, and, more important, kept. The stud-breeder should resolve to improve his methods so that he may produce stock of the highest quality and value, which he will feed on scientific principles. He will, perhaps, if he be wise, resolve to distribute only good, reliable stock, and consign all others to the pot. The small holder, who may be desirous of adding to his or her income should resolve to begin in a small way and gradually work up a profitable flock of birds. By adopting modern methods of housing and feeding the profits may be assured. If information on any point is desired the Poultry Expert will be pleased to give it. The old saying that there is wisdom in many counsels does not apply to poultry-breeding. The farmer, his wife, and family should resolve to shake off the apathy so apparent of late years. Let them abolish the non-productive feathered ones now doing duty as farm poultry. Let them add materially to their incomes, even if already large, and thereby promote a valuable industry. Let the farmers replace their mongrel hens with modern utility poultry.

Eggs.—All poultry-breeders should resolve to gather their eggs at least once a day, and to provide clean nests with plenty of straw so that the eggs may be kept clean. They should resolve to market the eggs as often as possible and sell or dispose of only those eggs which are known to be fresh. They should instil these facts into their neighbors' minds.

Table Poultry.—Breeders should prepare to breed early in the autumn so as to have a supply of fat young birds when prices are high in the spring. They should resolve to sell table poultry when young and properly fattened. In all matters all poultry-breeders should resolve to co-operate in extending and improving the condition of the poultry industry.

The Young Stock.—During the hot weather the young stock will need much attention if success is to be attained. Cull out and dispose of all inferior specimens, poor doers, cripples, or puny specimens. The room they occupy will be invaluable to the selected chickens. Do not overcrowd; aim rather to produce a moderate number of really live, strong, well-grown stock.

Greenfood.—All poultry may, during the hot weather, have an unlimited supply of succulent greenfood—this is the time when they most require it.

Not only is greenfood cooling to the system, but the mineral salts so essential to proper development are best supplied in this form. Green lucerne, endives (bitter lettuce), and clover are rich in salts, and are therefore excellent. When breeders use more greenfood there will be less troubles. Greenfood contains salts and minerals in the organised form in which they can be assimilated. It is of very little use when troubles are at hand to give inorganic salts and minerals with the expectation that they will cure all the resulting ills.

Sanitation.—Keep poultry-houses clean, and frequently spray with disinfectants. Fork over the soil in the runs and give them a spell occasionally. Strict attention to this matter will save much loss and trouble. Scald out the drinking vessels and see that the water is always cool and kept in absolute shade.

Poultry Ticks.—During the warm weather these pests, if not exterminated, will cause great losses. Numerous cases of losses, on examination, proved recently to be due to poultry ticks, and not to outbreaks of disease. Remember that it is illegal to allow poultry ticks to infest your premises. If your neighbors' premises are infested and so cause trouble to you, write to the Poultry Expert, who will take measures to abate the nuisance. Lose no time in eradicating all ticks.

The Export Trade in Table Poultry.—As in previous years, shipments to England will be made in January, February, and March. Ducklings will be received until February and chickens only during March. It does not pay to make late shipments of ducklings. The prices received for the various shipments have been very satisfactory. Full particulars on application.

The Laying Competitions.—Entries close at the office of the Poultry Expert, Department of Agriculture, Victoria Square, Adelaide, on January 31st. The tests will be for 12 months, beginning on April 1st, 1912, and terminating on March 31st, 1913, as follows:—Roseworthy, Section I., light breeds; Section II., heavy breeds—six pullets in a pen. Entry fee 10s. Open to the world. Open yards. Section III., scratching shed test. Twenty pens were available for this test, and they were all applied for at once. Kybybolite, section I., light breeds; Section II., heavy breeds—six pullets in a pen. Housed during winter and wet weather in scratching sheds. Entry fee 10s. Restricted to breeders in the South-East.

It is pleasing to note that 30 pens have already been promised by Mount Gambier and Kalangadoo breeders. Fifty-two pens is the limit. South-Eastern breeders are requested to support the test, which, in accordance with general request, is made purely local.

Surplus Stock at Poultry Stations.—There are still some splendid Buff Orpingtons, Black Orpingtons, and Plymouth Rock stud birds for disposal at very reasonable prices. Some promising chickens are also for sale. Apply in the first instance to the Poultry Expert, Adelaide.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started on April 1st, 1911, and to terminate March 31st, 1912.]

Competitor.	Eggs Laid for Month ended December 31st.	Total Eggs Laid from April 1st, 1911, to Dec. 31st, 1911.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS (except where otherwise noted).

The Range Poultry and Egg Farm, Toowoomba, Queensland ..	130	927
Gosh, A. J., Normanville	126	942
Cowan Bros., Burwood, N.S.W.	114	918
Hamill, H., Kogarah Bay, Sydney	119	866
Rhodes, H. G., Brompton	109	681
Collings, O. A., Riverton	139	923
Hay, C., Normanville	95	935
Stevenson H., Port Melbourne, Victoria.....	131	765
Pope, F., jun., Rockleigh	91	656
Malthouse, James, Normanville	121	883
Moritz Bros., Kalangadoo	120	934
Whetstone & Knappstein, Clare	117	762
Lampe, Bert, Kadina, S.A.	115	768
Collings, O. A., Riverton	123	961
Bertelsmeier, C. B., Clare	109	931
Bond, A. J., Clare	124	760
Moritz Bros., Kalangadoo	120	835
Waite, F. J. Osborne, Nailsworth	104	764
Ellery, J., & Son, Clare.....	136	900
Kempster, T. E., Lilydale, Victoria.....	114	712
Kinnear, Mrs. A. E., Hyde Park.....	122	799
Steer, W. J., Port Pirie West	120	722
Fitz-Gerald, Gerald, Mordialloo, Victoria	124	826
Featherstone, Mrs. M. A., North Croydon.....	117	718
Lawson, Miss N., Lower Mitcham	119	810
Provis, Mrs. W., Eudunda	129	823
Steed, J. F. T., Woodville	126	879
Uren, Mrs. P. A., Kapunda	135	947
Codling H., Mitcham Park	121	797
Provis, W., Eudunda.....	106	810
Pedder, E. A., Burnside	116	833
Tockington Park Poultry Farm, Grange.....	110	834
Swann, V. Roy, Jamestown	102	593
Miels, C. & H., Littlehampton.....	100	707
Wondatta Poultry Farm, Eudunda	89	516
Purvis, Master James, West Glanville	106	838
South Yan Yean Poultry Farm, South Yan Yean, Victoria....	92	711
Sargenfri Poultry Yards, East Payneham	118	822
Mazey, Phillip, Alberton.....	120	826
Padman, A. H., Hyde Park	134	927
Hill Chas., Monarto South	120	730

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended December 31st.	Total Eggs Laid from April 1st, 1911, to Dec. 31st, 1911.
SECTION I.—LIGHT BREEDS—Continued.		
WHITE LEGHORNS (except where otherwise noted).		
Read, J. D., Springhurst, Victoria	127	768
Mildren, D., Clare	126	852
Eckermann, W. P., Eudunda	128	902
Hurford, E. W., Grangeville	131	925
Sargenfri Poultry Yards, East Payneham	118	814
Shepherd, R. H., Balaklava	118	818
Rice, J. E., Cottonville	109	812
Burden, H. P., Balaklava	109	834
South Yan Yean Poultry Farm, South Yan Yean, Victoria....	129	857
Keddie, R. A., Woodside	127	838
Purvis, Miss Gracie, West Glanville	117	905
March, H. S., Kapunda	119	818
Mildren, D., Clare	128	879
Hill, Chas., Monarto South	72	752
Marshall, J. W., Moonta	112	846
Hollands, Iru, Moonta	122	846
Dyer, P., Woodville	109	839
Edgar, R., Moonta	113	878
Hocking, E. D., Kadina	121	873
Purvis, W., West Glanville	129	960
Carling, R., Kangaroo Flat	136	866
Howlett, H., Moonta	122	780
Addison, Mrs. A. L., Malvern	120	738
Menkens, F. H., Henley Beach	128	896
Haimes, T. F., Fullarton Estate	111	781
James, Wm., Croydon	118	702
Pettigrove, T. A., Northcote, Victoria	114	792
Read, J. D., Springhurst, Victoria	97	629
Riordan, D., Kent Town	98	706
Kappler Bros., Marion	116	786
Bertelsmeier, C. B., Clare	132	869
"Koonoowarra," Enfield	124	792
Marrison & Smith, Prospect	133	812
Connor, D. C., Gawler	118	842
Thistle Stud Poultry Farm, Quorn	144	790
Uren, P. A., Kapunda	138	797
March, H. S., Kapunda	113	864
Navan Poultry Farm, Minlaton	104	643
Holmes, F. A., Frances	108	766
Lillywhite, B. G., Dulwich	90	617
Burden, Mrs. M., Islington	99	739
Coombes, E. E., Silverton, N.S.W.	117	875
Curtis, G. R., Mitcham	98	749
Roehe, Mrs. N., Middle Brighton, Victoria	86	621
Mitcheson, R. H., Prospect	117	870
Hannaford, F. E., Monteith	110	768
Belcher, P. A. S., Georgetown	113	690
Whitrow, A. J., Knoxville	116	804
"Eurinima," Kybybolite	101	643
Kalms, A. G., Eudunda	114	740
Counter, E., & Foreman, Hindmarsh	103	653
Morton, T. W., East Moonta	98	617
Hall, T. C., Rose Park	96	684

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended December 31st.	Total Eggs Laid from April 1st, 1911, to Dec. 31st, 1911.
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SECTION I.—LIGHT BREEDS—*Continued.*

WHITE LEGHORNS (except where otherwise noted).

Ontario Poultry Farm, Clarendon	113	722
Biggs, W. D., Hyde Park	119	801
Tomlinson, W., Clarence Park	108	687
Redfern Poultry Farm, Caulfield, Victoria	154	1,118
Sickert, P., Clarence Park	99	952
Bennett, W. C., Magill	127	873
Franklin, G., Kent Town (Minorcas)	94	774

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTON.

Brundett, S., Moonee Ponds, Victoria	79	764
Phillips, A., Portland, S.A.	107	735
Cowan Bros., Burwood, N.S.W.	97	769
Hutton, C., Parkside	96	607
Bertelsmeier, C. B., Clare	74	560
Tockington Park Poultry Farm, Grange	73	689
Padman, J. E., Plympton	90	750
Killara Poultry Farm, Tyatt, Victoria	84	664
Martin, B. P., Unley Park	97	848
Francis Bros., Fullarton	77	754
Bertelsmeier, C. J., Clare	77	657
Padman, J. E., Plympton	59	740
Killara Poultry Farm, Tyatt, Victoria	97	800
McKenzie, E., Northcote, Victoria	84	864
Craig Bros., Hackney	98	932

BUFF ORPINGTON.

Ross, J. W., Somerton, <i>via</i> Glenelg	63	633
Hocart, F. W., Clarence Park	71	625

WHITE ORPINGTON.

Sykes & Harvey, Hamley Bridge	81	620
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SILVER WYANDOTTES.

Cant, E. V., Richmond	68	780
Kappler Bros., Marion	82	717
Burden, H. P., Balaklava	94	668
Redfern Poultry Farm, Caulfield, Victoria	89	597

LANGSHANS.

Stevens, E. F., Littlehampton	83	717
Jonas, H. D., Broken Hill	96	806
Toseland, Geo., Geranium	129	804

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended December 31st.	Total Eggs Laid from April 1st, 1911, to Dec. 31st, 1911.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS (except where otherwise noted).

Moritz Bros., Kalangadoo	137	1,103
Sudholz, Alf., Kalangadoo	75	745
Boyce, J., Kalangadoo	123	811
"Mahama," Mount Gambier	113	965
"Herdsfield," Mount Gambier	110	891
Lewis, C., Bordertown	89	711
Staunton, S., Naracoorte	88	621
Lillywhite, R. G., Dulwich	77	804
Jarrad, J., Mount Gambier	115	900
Hall, C. W., Mount Gambier	105	874
Sargent's Poultry Yards, East Payneham	102	852
Vorwerk, H. F. & A. C., Millicent	124	942
Lacey, F. C., Kybybolite	124	868
Kinnear, Mrs. A. E., Hyde Park	86	803
Rake, A., Kalangadoo	117	812
"Eurinima," Kybybolite	73	673
Smith, R. L., Hynam	78	647
Day, Mrs., Roseworthy	80	679
Scholz, C. H., Kybybolite	93	796
Purvis, W., West Glanville	100	847
Hannaford, Mrs. F. E., Monteith	103	837
Jenkins, Mrs. C. J. A., Kybybolite	92	780
Bertelsmeier, C. B., Clare	103	817
Navan Poultry Farm, Minlaton	87	663
Scholz, A. R., Kybybolite	89	724
Mohr, S., Tantavool	76	803
Featherstone, Mrs. M. A., North Croydon	85	659
Toseland, G., Geranium	67	691
"Koonoowarra," Enfield	101	688
Palmer, W., Franklin Street, Adelaide	77	654
Cosh, A. J., Normanville	91	770
Queale, W., Lameroo	65	747
Tomlinson, W., Clarence Park	79	614
Reed, A. J., Pinnaroo	75	665

SECTION II.—HEAVY BREEDS.

SILVER WYANDOTTES.

McNamara, Mrs. D., Mount Gambier	53	646
Moritz Bros., Kalangadoo	50	529
Staunton, S., Naracoorte	77	567
Burden, H. P., Balaklava	66	639
Vorwerk, H. F. & A. C., Millicent	62	634
Virgo, A. W., Bordertown	42	442

BLACK ORPINGTON.

Smith, W., Hynam	58	438
Phillips, A., Portland, S.A.	43	527
McNamara, Mrs. D., Mount Gambier	33	522
Bertelsmeier, C. B., Clare	16	457
Blue Lake Poultry Yards, Mount Gambier	64	685
Bail, H., Kaniva, Victoria	45	573

LANGHANS.

Toseland, Geo., Geranium	75	677
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NOTES ON EGG-LAYING COMPETITIONS.

December, which as usual was characterised by unsettled weather, generally gives an indication of an early moult, and the month just past was no exception. As a rule an early moult, if gradual, does not affect egg production to the same extent as a sudden, severe moult. Occasionally a pen of birds may hold its feathers until the termination of the test. While the egg production has been satisfactory there are several features which accentuate the fact that the birds entered in both Kybybolite and Roseworthy competitions are not as good as they should be.

The majority of the breeders entered two or more types, and evidently did not know upon which to depend. As a result, in many pens, three or four hens have laid well and the others were drones.

The prevalence of broodiness among the Leghorns is a regrettable feature. Breeders must eliminate this factor without delay, even if they are compelled to build up new strains.

The Superintendents' reports are as follows:—

ROSEWORTHY.

The general health of the birds has been good. In Section I. four hens, White Leghorns, died of troubles connected with the organs of reproduction. It is to be noted that among White Leghorns these troubles are becoming prevalent. In Section I., light breeds, 74 cases of broodiness have occurred, and in Section II., heavy breeds, there were 89 cases. The majority of the birds are on a light moult. The 606 hens in Section I. laid 11,698 eggs, and the 150 hens in Section II. laid 2,145 eggs during the month. The averages are 19.3 and 14.3 respectively. The leading scores were 154 by the pen owned by the Redfern Poultry Farm, Caulfield. Thistle Stud Farm, Quorn, totalled 144 in Section I. The top score is now 1,118. In Section II. Craig Bros., Black Orpingtons, lead with a score of 932 eggs. The average temperature for the period was—Average maximum, 87.1°; highest reading, 116.2° (shade); average minimum 51.2°; lowest reading, 45°. Rain fell on five days: total recorded, 1.53in. Wind was recorded on 24 days, the direction on 12 days being from the south-west.

KYBYBOLITE.

The birds are all in good health. Three deaths occurred in Section I. Some of the birds are commencing to shed their feathers. In Section I. there have been 10 cases of broodiness in 204 White Leghorn hens, and in Section II. there were 33 cases in 78 hens. The month has been characterised by an unusual amount of wind. The weather and the broodiness combined have considerably affected egg production. In Section I. 204 hens laid 3,199 eggs, the average being 15.6; and in Section II. 78 hens laid 690 eggs, an average of 8.8 per hen.

D. F. LAURIE, Poultry Expert.



ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on December 13th, there being present Messrs. A. M. Dawkins (chair), C. J. Tuckwell, G. R. Laffer, A. J. Perkins, J. Miller, C. J. Valentine, C. Willcox, Col. Rowell, and G. G. Nicholls (Secretary).

APPOINTMENT OF THE CHIEF INSPECTOR OF STOCK AS A MEMBER OF THE BOARD.

An intimation was received from the Minister to the effect that he had appointed Mr. T. S. Williams (the Chief Inspector of Stock) to be a member of the Board.

DEPUTATION TO THE RAILWAYS COMMISSIONER RESPECTING DEMURRAGE AT COUNTRY STATIONS.

The Chairman stated that a deputation representing the Board had waited upon the Commissioner of Railways that morning with reference to demurrage charges on the railway and the extension of the time for unloading trucks at country stations. The Secretary's report of the deputation stated that the Chairman had said that the position regarding demurrage in the farmer's case was different from that of the ordinary business man. Although consignors sent advices of the forwarding of the goods, the chief difficulty was that the goods were frequently delayed *en route*, and the farmer, having come a long distance with his team and wagon, would find that they had not arrived, and would have to return. He quoted a case in which he himself had sent a wagon, 10 horses, and two men to the railway for phosphates; but, as the train had been heavily laden his particular trucks had been put off. The next day he was compelled to water stock, and in the meantime demurrage charges were incurred. He suggested that in the event of the Commissioner being unable to extend the time allowed for unloading, the Railway Department should unload the trucks at the cost of the consignee, and store the goods at the usual rates of storage. Mr. J. W. Sandford supported, and emphasized the fact that there was a decided element of doubt as to the arrival of the goods; also that the request which had been made to the Commissioner was the outcome of practically a unanimous vote at the recent Congress of the Agricultural Bureau, which was thoroughly representative of farmers in all parts of the State. Mr. J. Miller mentioned that, in addition to the uncertainty of the arrival of the goods in many country places, there was great difficulty in getting mails delivered at the smaller towns, and the advice to the farmers

that goods were on the way was frequently delayed. Mr. C. Willcox summarised the position, and stated that if 16 hours could not be granted for unloading, the Commissioner would ease the position considerably by making it 12 hours instead of eight hours. The Commissioner promised to give the matter his full consideration. He saw a real difficulty, inasmuch as any concession made to farmers would naturally be sought for by others, and, being a Government department, it would be necessary to extend it to them. He thought farmers could get over the difficulty by appointing an agent in the railway town to receive goods on their behalf. Mr. Dawkins said that while that would be possible in some of the larger towns, at many smaller railway stations it could not be done. He further thought that the payment for this agency in the matter of unloading might as well be secured by the railways as by some outside person. Mr. Willcox thought the charges for agency would be so high as to render that course impracticable.

The Secretary added that immediately after the deputation, in view of the suggestion made by the Commissioner that if the desired concessions were granted to farmers others would also want them, Mr. Dawkins and himself had again scanned the regulations, and, as a result of their investigations, the Chairman had immediately forwarded a letter to the Commissioner, asking him to consider the following facts:—"Clause 35, page 20, of the current goods rates book provides for storage charges in sheds at 9d. per ton per week, and on platform and in yards at 6d. and 2d. respectively. Further, it is provided that one week's free storage will be allowed upon certain goods (manures not included), and that 12 working hours' free storage will be allowed on the goods of the miscellaneous class (including manures), in the case of the consignee's place of business being more than seven miles from the railway town. In the event of the Commissioner being unable to extend the time for unloading from eight to 16 working hours, the needs of the farmers would be met by the following arrangement if it could be made, viz., that any consignees, being more distant than seven miles (or less as decided by the Commissioner) from the railway town, may make either a temporary or permanent arrangement with the stationmaster to unload at the cost of the consignee all trucks consigned to him. In such a case, if the consignee living outside the prescribed radius came for goods within 12 working hours of arrival, he would have to pay only the cost of the unloading, and if a day or two elapsed before he took delivery the usual storage rates would be charged in addition. Respecting the Commissioner's suggestion that a concession made to those distant from country stations might be sought by others, it is pointed out that in section B of the clause quoted a distinct concession in storage is made to those who reside at a distance from the station. If the Commissioner could arrange for the railway staff to do this unloading under the conditions set out, it would be rather of the nature of a business arrangement than a concession."

VETERINARY SURGEONS FOR COUNTRY DISTRICTS.

The following report was received from the Minister of Agriculture :—" I have approved of a scheme for district veterinary surgeons in the principal agricultural centres. The Government will subsidise veterinary surgeons under certain conditions, one of which will be that they shall give special lectures where classes can be arranged. I hope to start the scheme early next year, and the provision will permit of seven veterinaries being obtained, while the full scheme provides for 20. This, however, will take several years to develop to this extent. Farmers availing themselves of the aid of a subsidised veterinary will be required to pay him fees on a scale approved by the Minister."

SALE OF FRUIT FROM HAND TRUCKS.

The Secretary reported that the Government had decided not to confirm the proposed corporation by-law which sought to prohibit the sale of fruit in the city streets from hand trucks.

CARRIAGE OF GRAIN IN CHAPMAN SACKS.

Relative to the resolution passed at Congress, a reply was received from the Railways Commissioner as follows :—" I have carefully inquired into this matter. I do not think there is any necessity for an alteration of the by-law, and, so far as I am aware, no farmer has ever been penalised for overweight when forwarding grain in Chapman sacks. The by-law was intended to prevent the lumping of bags of wheat exceeding 200lbs. in weight, and as it has had the desired effect it should not in my opinion be interfered with." The Commissioner of Public Works intimated his approval of this decision.

THE HUNDRED OF MOLINEUX.

It was reported that in response to a suggestion made by the Board the Government had decided to perpetuate the memory of the late Mr. Albert Molineux by applying his name to one of the new hundreds south of the route of the Tailem Bend to Brown's Well railway. The hundred adjoined Marmon Jabuk, and was directly north of Price.

NOXIOUS WEEDS.

The Secretary stated that the resolution agreed to by the Board—" That the Government be asked to introduce a Bill to provide for new legislation for the destruction of noxious weeds, and to remove the administration of any regulations from the hands of the local governing bodies and to place it with the Department of Agriculture"—had been considered by Cabinet, which had decided that the matter should be dealt with next session.

THREE NEW BRANCHES.

Approval was given to the formation of Branches of the Bureau at the following places, with the undermentioned gentlemen as members :—

Pinnaroo.—Kelly, W. H. ; Ledger, H. ; McCabe, M. ; Coade, R. ; Roberts, R. ; Wright, L. ; Lee, C. ; Wilson, M. ; Docking, J. ; Kelly, W. A. ; Wilson, G. ; Edwards, P. J. ; Hunt, F. ; Fewings, C. ; Reed, A. J. ; Fewings, H. ; Jones, R. A. ; McCabe, R. ; Jones, P. J. ; Venning, W. ; Kelly, M. ; Edwards, Roy ; Harfield, H. B. ; O'Loughlin, J. ; Edwards, F. H.

Narrung.—Morgan, N. ; Sullivan, M. ; Bottrill, S. and J. W. ; Bowyer, H. ; Rumbelow, W. H. ; Thacker, W. J. L. ; Baker, F. C. ; McNicol, F. C. ; Goode, E. L. ; Bolger, L. ; McNichol, J. W. ; Ayres, F. G. ; Morgan, S. E. and J. ; Gardiner, H. P. ; Hackett, G. G.

Mount Barker.—Little, J. ; Davies, P. ; Blades, A. B. ; Pearson, W. ; Clegget, Jas. and Geo. ; Paterson, J. ; Hender, J. ; Brinkley, J. ; Crompton, C. ; Pope, J. ; Frame, J. ; Frame, B. ; Stephenson, W. L. ; Stephenson, B. ; Stephenson, P. ; Fuller, B. ; Ragless, — ; Schmidtke, E. ; Trelevan, H. and F. ; Jones, H. ; Braendler, A. E. ; Braendler, C. G. ; Blight, Fred ; Simper, F. ; Warlaw, G. ; Grimes, R. H. ; Liebelt, C. P. F. and J. F. ; Hill, J. ; Scandrett, W. ; Virgo, Fred ; Bell, H. N. ; Cornish, J., A. E., and L. A. ; Edwards, J. ; Choat, J. ; Beavis, Bennett ; Smith, J. E. ; May, B. ; Wollaston, C. ; Follett, F. ; Ferguson, A.

NEW MEMBERS.

The following gentlemen were approved as members of the undermentioned Branches :—Paskeville—Disher, R. C., Lamming, M. ; Meningie—Dainty, M. and E., Yates, W. H., Rettit, P. P. ; Mallala—Weatherill, A., Temby, A., Curnow, J. C. ; Strathalbyn—Traeger, F. C., Knight, W. ; Saddleworth—Kelly, F. H., Castey, A. J. ; Mount Pleasant—Rockster, W., jun., Miller, S. ; Woodside—Morcomb, J. A. ; Green Patch—Chapman, R. ; Nantawarra—Herbert, E. J. ; Arthurton—Heynes, J. ; Northfield—Thompson, A., Lamming, S. ; Morchard—Toop, W., jun. ; Clare—James, R., Knappstein, O. ; Port Elliot—Prince, J. F. ; Wirrabara—Stott, A. E. ; Morphett Vale—Anderson, A. ; Riverton—Thomas, H. C., Kemp, A. F. ; Keith—Lambert, J., Pearson, H., Fulwood, W. ; Minlaton—Nankivell, W. ; Wirrega—Laurenti, H. N. ; Coonalpyn—Venning, R. F.

SORGHUM POISONING.

INVESTIGATIONS IN QUEENSLAND.

[From "Agricultural and Pastoral Notes" supplied to the Queensland Country Press.]

Investigations in respect to the poisonous properties of sorghum have been made in many of the dairying countries of the world. In Queensland, some years ago, a number of dairy cattle suddenly died while feeding on sorghum. At first hoven, or bloat, was suspected as the cause of death; but, owing to the rapidity with which the cattle succumbed, more virulent causes than those arising from the mere gorging of the animals were looked for.

CAUSE OF POISON IN SORGHUM.

The number of deaths among the dairy cattle in Queensland, in the year 1903, led the Department of Agriculture in that State to a strict investigation concerning sorghum, with a view of determining whether the mortality among the cows was due to any poisonous constituents the plant contained.

It was shown that in some cases fields of sorghum, with only a dividing fence between, gave entirely different feeding results, although the sorghum from each field was fed to the cattle at similar stages of its growth. One herd would be affected on one side of the fence, while the herd on the other side, in a field immediately adjacent, thrived on the succulent fodder. In each field the cows were grazing on young sorghum.

Dr. Maxwell and Mr. J. C. Brunnich, chemists of the Queensland Department, undertook to solve the problem, which seemed at the time to have certain elements of mystery. It was naturally a puzzling situation to dairy farmers. Without definite proof they could not be convinced that the sorghum was responsible for the deaths of their cattle.

It has been known to science for some years that sorghum and similar plants, grown in rich soils, were more liable to contain highly dangerous amounts of hydrocyanic acid—commonly known as prussic acid—than when grown in soils poor in nitrogen. It was found that the nature of different soils very largely governed the amount of these poisonous properties in the plant. This explained why some cows were affected through eating sorghum in one field, while those in an adjoining field, consuming the

same class of material, did well. The changing character of the soil varied the amounts of prussic acid.

In a specific case it was noticed that one field—in which cattle were immune—gradually sloped upwards. The analysis of the soil from this field showed a deficiency in nitrogen.

TESTING SORGHUM GROWTHS FOR POISON.

To test the relation between the incorporation of the prussic acid in the growing sorghum plant, and the ratio of the nitrogen in the soil, several plantings of sorghum were made in the Botanic Gardens at Brisbane in soil composed almost exclusively of sand. One series of plants was not given any special manurial assistance, while another series was manured with nitrate of soda, a manure whose chief element is nitrogen. This experiment was made in order to see whether the supply of additional nitrogen to the soil would increase the amount of prussic acid in the growing plant—nitrogen being an element of that poison.

Mr. Brunnich made repeated analyses, which showed, with almost mathematical precision, that the supply of available nitrogen increases the amount of poison that sorghum and other plants are capable of making and storing up within their composition:

THE SORGHUM POISON AT DIFFERENT STAGES OF GROWTH.

Determining the stages in the growth of sorghum when the poison in it would be at the danger limit was a very interesting and valuable phase of the investigation. It was found by the experiments that sorghum grown in highly rich, nitrogenous soils could not be freely fed to animals with safety until the plant is preparing to seed.

The sorghum plant—grown under the conditions described—when very young, and from the age of three up to seven weeks, contains distinctly dangerous amounts of prussic acid. After that age the poison rapidly disappears by decomposition, the nitrogen passing over into other and strictly nutritious elements of food. When the flowering stage is reached, not more than a trace of the poison is found.

As the growth of the plant does not entirely depend upon the age or the number of weeks since it was planted, it is well to speak of its stages of development. It may be generally stated that the sorghum plant is not safe for feeding until it reaches the flowering or seeding stage.

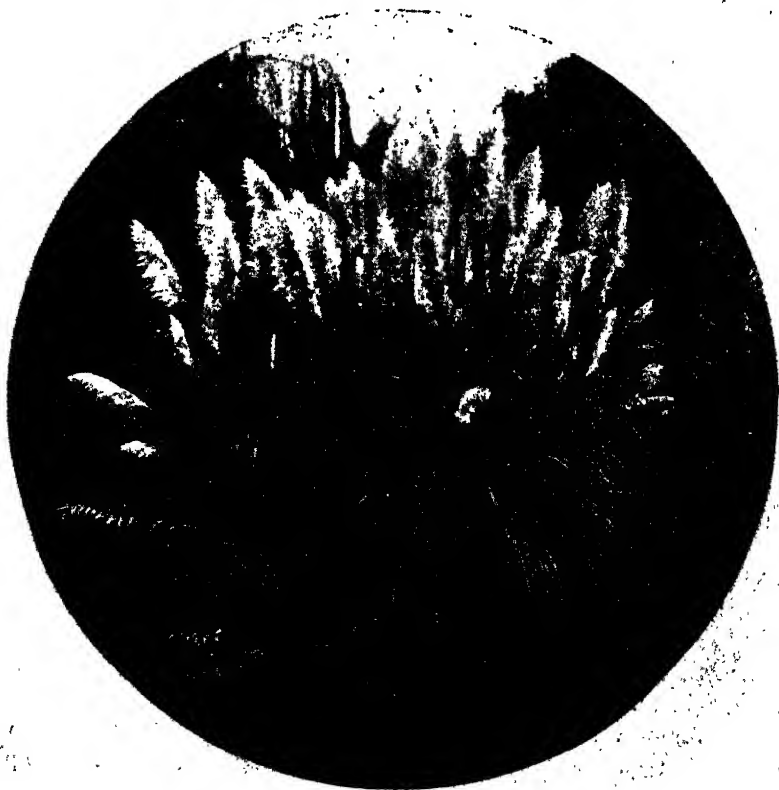
When Young Sorghum is Mixed it is Not Dangerous.

Dr. Maxwell reported that even sorghum, and such plants as may be known to contain dangerous amounts of prussic acid, may be judiciously used as a green mixture with dry hay chaff to make the food tasty to animals. When diluted in this way, the green sorghum must be very carefully stirred up and

mixed with large quantities of the dry feed, no harm will follow. The dry feed is, in this way, also made capable of use.

That there is a danger in allowing stock free course to the young growing sorghum is beyond doubt, since it has been proven that the whole trouble is due to the presence of the poison as stated. The fact of the poison being prussic acid accounts for the sudden fatalities immediately following when cows have free access to sorghum produced under the conditions outlined. The prussic acid rapidly spreads through the system, and has an almost immediate fatal effect.

It may be mentioned that these plant-poison investigations have been extended to include maize, sugarcane, and most of the grasses in use. Prussic acid has been found in quantities varying from *nil*—a mere trace—and up to the danger point. So far, however, only *Panicum muticum* comes anywhere near the sorghum plant in its dangerous content of the poison. Sugarcane and *Paspalum dilatatum* were found free of prussic acid. Traces were found in maize produced in rich soil, but not near the danger limit.



THEORIES OF PLANT NUTRITION.

SOME AMERICAN HYPOTHESES.

In an article entitled "The Soil and the Plant," which appears in the current issue of *Science Progress*, Dr. E. J. Russell, of Rothamsted, discusses some recent American hypotheses on plant nutrition. According to the generally accepted view, manures benefit plants by directly supplying nutritive materials. For example, when phosphates are added to the soil it is believed that they go to supply the phosphorus required by the growing plant. Of recent years, however, a different view has obtained some vogue. It originated in America, and has been adopted by the Bureau of Soils of the United States Department of Agriculture.

The new hypothesis is based on the assertion that the "concentration" of the soil moisture is always constant, whatever the manurial treatment may have been; in other words, it is asserted that the amounts of nutritive salts in solution in the soil water remain constant. If this is true it follows that the chemical constitution of the soil is without effect on plant growth; fertility must depend upon the physical factors regulating the supply of soil solution to the plant; for if the soil solution is always the same, plants can obtain more nutritive substances only by obtaining a greater volume of the solution. To complete the hypothesis, it is asserted that infertility is often due to the presence in the soil of toxic substances, some of which have undoubtedly been isolated. The old hypothesis of de Candolle is thus revived, and the toxicity is believed to be due to the presence of substances excreted by plants in the normal processes of growth, such substances being harmful to other plants of the same genus, but not necessarily harmful to plants of a different kind.

A convenient explanation is thus provided for the beneficial action of rotation of crops and the sterility which results when the same crop is grown continuously on the same ground. In order to explain the unquestioned beneficial effects of fertilisers, which the above hypothesis would seem to negative, it is supposed that they act either on the distribution of the soil moisture, or as antidotes to the toxic substances.

In discussing this hypothesis Dr. Russell in the first instance points out that the evidence is insufficient to establish the primary assumption that the soil solution is constant for all soils. Figures are quoted to show that

the concentration, while showing little absolute variation, yet relatively differs considerably. The difference between five parts per million and 30 parts per million, when stated in concrete figures, is small, but relatively it is equivalent to a difference of 500 per cent. Moreover, the irregular distribution of the figures, showing the number of results for each degree of concentration, suggests that the variation is outside the ordinary experimental error.

In the next place Dr. Russell contests the view that variations in the soil concentration do not influence the rate of plant growth, and consequently are without influence on fertility. He points out that, while there is always a limiting factor which controls the situation, the amount of growth in nutrient solutions tends to increase as the concentration of salts is increased.

With regard to toxic substances, it is pointed out that it is not surprising that some of the numerous organic compounds in the soil should have a toxic action when supplied to the plant through the medium of a water culture. It does not follow that such substances retain their toxic properties when added to the soil. In regard to the phenomena associated with "sour" soils, the writer is, however, prepared to admit that toxic substances may be present.

In regard to the excretion of toxic substances during the normal processes of growth, Dr. Russell is able to bring forward the results of his own work at Rothamsted, and to show that there is no evidence in support of this hypothesis. Plants grown continuously in water, sand and soil cultures for as many as six generations, have shown no signs of suffering from toxicity. Again, wheat has been grown continuously in the Broadbalk field at Rothamsted for 60 years, but so far there is no sign that the plot is suffering from the presence of any toxic substance.

It must be admitted that the investigations of the Bureau of Soils have served a useful purpose in directing attention to factors of fertility other than the chemical composition of the soil. Physical conditions undoubtedly play a more important part than the earlier chemists were disposed to assign to them, but investigation on fertility cannot be restricted to chemical and physical conditions: the biological changes which go on in the soil must be investigated, and these again cannot be restricted, as they have been hitherto, to the bacterial flora. As Dr. Russell's work on soil sterilisation demonstrates, higher forms of life are probably at work, and may exercise a profound influence on plant growth.

PRODUCING WHEAT, OATS, AND MAIZE.

COST IN UNITED STATES.

An estimate of the cost of producing cereals in the United States in 1909 has been made by the Bureau of Statistics of the United States Department of Agriculture. The estimate is based on the replies received from about 5,000 correspondents of the Bureau of Statistics, who were asked to supply information on the following points:—Cost per acre of (1) commercial fertilisers, (2) preparing ground for seed, (3) seed, (4) planting, (5) gathering or harvesting, (6) preparing for market, (7) wear and tear on implements, (8) rent of land or interest on its value, (9) other items of cost, (10) total cost, (11) average yield of product per acre, (12) value per bushel, (13) value of crop per acre (not including by-products), (14) value of by-products, (15) average size of fields in acres, (16) average value per acre of land growing the crop.

The cost of the labor, both manual and of animals, whether owned or hired, was estimated upon the basis of the prevailing rate of wages paid, whether the actual work were done by the owner or hired labor. The cost of preparing ground for seed included the cost of applying manure where this was done; and the cost of cultivation included all costs from the time the crop was planted until ready for harvesting. With the cost of preparing for market was included all expenses between harvesting and marketing. The information received by the Bureau from its correspondents referred either to their own farms or to typical farms in their vicinity.

As a result of this inquiry the following estimates have been obtained (a dollar has been reckoned at 4s. 2d.):—

	Wheat. s. d.	Oats. s. d.	Maize. s. d.
Cost per acre, excluding rent	32 8	29 8	35 6
" including rent	46 6	45 6	51 1
Value of grain, per bushel	4 0	1 8	2 7
" per acre	68 8	58 8	83 8
Cost per bushel, excluding rent	2 0	0 10	1 1
" including rent	2 9	1 4	1 7
Value of grain, less cost (i.e., profit) per acre, excluding rent	36 5	29 0	48 2
Value of grain, less cost (i.e., profit) per acre, including rent	22 8	13 2	32 7
Value of grain, less cost (i.e., profit) per bushel, excluding rent	2 1	0 10	1 6
Value of grain, less cost (i.e., profit) per bushel, including rent	1 4	0 5	1 0
	Per cent.	Per cent.	Per cent.
Excess of value over cost (i.e., profit), excluding rent ..	116	97	136
" " including rent ..	50	29	64
	Acres.	Acres.	Acres.
Average size of fields	59.6	25.5	30.2
	s. d.	s. d.	s. d.
Value per acre of land	227 6	293 8	247 8
	Per cent.	Per cent.	Per cent.
Percentage of rental to land value	6.3	5.4	6.3

Cost of Producing Wheat.—The cost of producing wheat is thus £2 6s. 6d. per acre, or 2s. 9d. per bushel. The cost per acre is made up of the following items (all per acre):—Artificial manures, 2s. 5d.; preparation of land, 8s. 10d.; seed, 5s. 11d.; planting, 1s. 11d.; harvesting, 5s. 6d.; preparing for market, 6s. 2d.; miscellaneous, 1s. 11d.; rent, 13s. 10d. The cost of production of wheat per acre varies from £4 18s. 8d. in Maine to £1 17s. 5d. in South Dakota, the chief reasons for the difference being the higher rent and cost of fertilisers in the former State; the cost of production per bushel is again greatest in the case of Maine, with an equally large cost in South Carolina, while a bushel of wheat is produced with least expense in Montana.

Yield of Wheat.—The yield of wheat varies from 36·2bush. per acre in Vermont to 12·8bush. per acre in South Carolina, the average for the United States being 17·2bush. An indication of the quality of the grain (4s. per bushel for the whole Union) is given by the value per bushel in the various States; this is greatest in the case of South Carolina and Georgia, and least in the case of Utah and Idaho. The average value of the grain per acre over the whole of the United States is estimated at £3 8s. 8d.

Profit from Wheat Growing.—Taking the country as a whole, the net profit from wheat-growing works out at £1 2s. 8d. for every acre under the crop, or at 1s. 4d. for every bushel of grain produced. The remarkable estimate of a profit of £4 2s. 6d. per acre was made for Vermont, while the cultivation of wheat would also appear to be a very profitable matter in the far western States of Montana, Wyoming, Colorado, and New Mexico. The profit is only about 10s. per acre in West Virginia, Kentucky, and Tennessee.

Cost of Producing Oats.—It will be seen that the average cost of producing oats in the United States is £2 5s. 6d. per acre, or 1s. 4d. per bushel. The various items which go to make up this cost are as follows (all per acre):—Artificial manures 1s. 8d.; preparation of land, 7s. 10d.; seed, 4s. 8d.; planting, 1s. 10d.; harvesting, 5s. 7d.; preparing for market, 6s. 4d.; miscellaneous, 1s. 10d.; and rent 15s. 9d. The highest cost per acre as regards individual States is in Maine and Maryland, with 86s. and 94s. per acre respectively, while the cost is lowest in Missouri and North and South Dakota, the expenses in each of these States not exceeding about 36s. per acre. The cost of producing a bushel of oats is highest in Connecticut and Maine (2s. 3d.) and Arizona (3s. 3d.), and lowest in North and South Dakota, Minnesota, Iowa, and Missouri (1s. 2d.). The average cost for the whole country is 1s. 4d. per bushel.

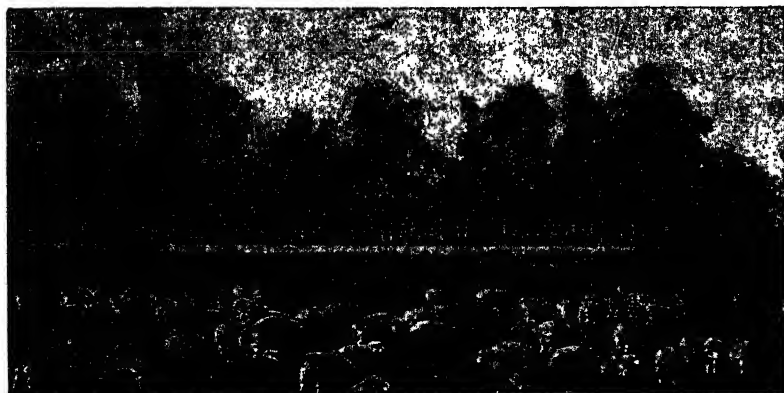
Yield of Oats.—The yield varies from 59·2bush. per acre in Utah and 51bush. per acre in Montana to 22bush. in Arizona and Florida, the average for the United States being 35·2bush. The grain is priced highest in Arizona (3s. 9d. per bushel), and lowest in Iowa, North and South Dakota, and Nebraska (1s. 5d. per bushel); the average is 1s. 8d. The average value of the grain per acre over the whole of the United States is estimated at £2 18s. 8d.

Profit from Growing Oats.—The above table shows that the profit from growing oats is 13s. 2d. from every acre under the crop, or 5d. for every bushel produced, these figures comparing very unfavorably with the corresponding figures for wheat. Large profits would seem to be obtained in several instances, however, notably in New Hampshire (47s. 2d. per acre), California (48s. 9d. per acre), and New Mexico (51s. 5d. per acre); in fact, the profit in the 10 far western States is three times as great as the average for the whole country.

Cost of Producing Maize.—The cost of producing maize is £2 11s. 1d. per acre, or 1s. 7d. per bushel. The cost per acre is made up of the following items (all per acre):—Artificial manures, 3s. 5d.; preparation of land, 8s. 10d.; seed, 1s.; planting, 1s. 10d.; cultivation, 9s. 4d.; harvesting, 9s. 2d.; miscellaneous, 1s. 11d.; rent, 15s. 7d. The cost per bushel, as well as the cost per acre, is highest in the New England States. In Maine the cost of production per acre is £7 14s. 5d., and per bushel 3s.; while in Oklahoma the cost per acre is £1 15s. 9d., and the cost per bushel 1s. 6d.

Yield of Maize.—The yield per acre is greatest in the New England States (New Hampshire 53·7bush.), and least in the States of Florida and Mississippi (19bush.); the average for the whole country is 32·4bush. per acre. A bushel of grain is priced highest in Georgia and Florida (3s. 9d.) and South Carolina (4s.), and lowest in Minnesota, Iowa, South Dakota, and Nebraska (2s. 1d.). The average value per bushel over the whole of the United States is 2s. 7d. The average value of the grain per acre is estimated at £4 3s. 8d.

Profit from Maize-growing.—The greatest profit per acre from maize-growing is obtained in Rhode Island and California (£2 19s. 6d.); as low a profit as 11s. 2d. per acre is made in Mississippi, while for the whole of the United States the profit averages £1 12s. 7d. per acre.—*Journal of British Board of Agriculture.*



THE WHEAT MARKET.

The wheat market during December was very steady, but the quotations on the closing day of the month were from $\frac{1}{2}$ d. to 1d. more than those on the opening. It is interesting to note that the price, 3s. 6 $\frac{1}{2}$ d. to 3s. 7d., ruling on December 30th was the same as that quoted on the corresponding date of 1910. Advices received from England indicate that operators there are adopting a very cautious policy until such time as the result of the harvest in the Argentine is definitely known.

The position on the English market on December 1st is shown by the following quotations from *Beerbohm's Evening Corn Trade List* :—

"The demand for cargoes continues slow, and in parcels only a moderate trade has been put through during the week. The tone at first, with unfavorable reports from the Argentine, was fully steady, and a slight advance was made for most descriptions, but subsequently the feeling became quieter, closing dull yesterday, with prices tending in buyers' favor. All markets continue to be mainly influenced by weather and crop reports from the Argentine. No definite estimate can yet be made of the yield in that country, as much still depends on the weather of the next few weeks, especially so far as the quality is concerned. It is much to be desired that the harvest will be favored by the weather, as there is plenty of inferior wheat to be obtained from North America; if the Argentine wheat prove to be of good quality there will no doubt be a very large demand for it. Crop reports from Australia are slightly more favorable; the official estimate for South Australia is for a yield of 2,585,000qrs., against 3,040,000qrs. last year.

"The latest official estimate of the Russian crop (for the 73 European Governments) shows a deficiency, compared with the report issued at this time last year, of 32,400,000qrs.; this is several million quarters smaller than the earlier estimate, but agrees very closely with the general opinion, held for about three months past, that the yield would be fully 30,000,000qrs. less than in 1910. The home consumption is about 63,000,000qrs., but may possibly be somewhat less this year, as in those provinces where the crop has been a failure the peasantry will no doubt be fed, to a certain extent, on cheaper food than wheat. Under any circumstance this year's crop leaves only a very small surplus for export, and the extent of the shipments from Russia will mainly depend on the quantity of old wheat brought forward at the commencement of the present season. If the official estimates of the 1909 and 1910 crops were approximately correct, Russia had about 15,000,000qrs. more wheat at the end of July, 1911, than at the end of July, 1909, so that everything depends on the accuracy of the official estimates. This confirmation of a very small yield fully explains the very natural reluctance of holders of Russian wheat to accept what they, from their point of view, consider low prices. This season, however, owing to the much larger production of wheat in importing countries, we are not nearly so dependent on Russia as last season, and if the Argentine crop prove to be a really large one the level of values will be mainly governed by the prices ruling for Plate wheat. Meanwhile, stocks at the ports are large and probably amount to 3,000,000qrs.

"There was a further increase in the American visible supply last week, the figures both for the States and Canada showing increases; the total amounted to the very large quantity of 106,989,000bush., against 77,031,000bush. last year. A good deal of this wheat is no doubt of inferior

grade, and, according to the *Northwestern Miller*, a good deal of the spring wheat is so poor in quality that it takes 39lbs. more wheat than in years of average quality to make a barrel of flour."

Date.		LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Dec.	5	Firm, but quiet; Liverpool, firm ..	3/6 ..	3/6½ to 3/6¾.	3/6½
	6	Quiet; Liverpool steadily held, but not active ..	Do. ..	Do. ..	Do.
	7	Firm; more inquiry ..	Do. ..	Do. ..	Do.
	8	Firm, but quiet; Oct.-Nov., 4s. 6d. ..	Do. ..	Do. ..	Do.
	9	Firm, but quiet ..	Do. ..	Do. ..	Do.
	11	— ..	Do. ..	Do. ..	Do.
	12	Firm, but quiet; Liverpool held for advance ..	Do. ..	3/7 ..	Do.
	13	Firm, but quiet ..	Do. ..	Do. ..	Do.
	14	Firmly held, but inactive ..	Do. ..	3/6½	3/6
	15	Steady, but quiet ..	Do. ..	3/6½	3/6 to 3/6¾
	16	Very firm, in better demand; Jan.-Feb., 4/6½	Do. ..	Do. ..	Do.
	18	— ..	Do. ..	3/6½ to 3/7 ..	3/6½ to 3/7
	19	Very firm; Aug.-Sept., 4/6 ..	3/7 ..	Do. ..	Do.
	20	Firm, 3d. to 6d. advance asked; Liverpool, firm but quiet ..	Do. ..	3/7 to 3/7½ ..	3/7 to 3/7½
	21	Quiet, easier tendency; Liverpool firmly held ..	Do. ..	Do. ..	3/7
	22	Dull; Liverpool, dull and lower ..	Do. ..	Do. ..	Do.
	23	Very dull; Liverpool, quiet, easier tendency ..	3/6½ to 3/7 ..	Do. ..	Do.
	25	— ..	— ..	— ..	—
	26	— ..	3/6 to 3/7 ..	3/7 ..	3/7
	27	— ..	Do. ..	Do. ..	Do.
	28	Steady, but quiet; Liverpool firmly held, but inactive ..	Do. ..	Do. ..	Do.
	29	Firm; held higher; no demand; Liverpool firm, inactive ..	Do. ..	Do. ..	Do.
	30	Dull; Liverpool, steady, but quiet; Aug.-Sept., 4/7½	3/6½ to 3/7 ..	Do. ..	Do.
Jan.	1	— ..	Do. ..	Do. ..	Do.
	2	— ..	Do. ..	Do. ..	Do.
	3	Steady, but quiet; Liverpool, firm, but quiet ..	Do. ..	3/7 to 3/7½ ..	3/7 to 3/7½
	4	Firmly held, but inactive ..	Do. ..	Do. ..	Do.
	5	Firm; 3d. to 6d. dearer; Dec.-Jan., 4/6½, 4/6¾, and 4/6½	3/7 to 3/7½ ..	3/7½ ..	3/7½

STEAMER FREIGHTS.—Steamers from South Australia to United Kingdom-Continent, full cargo rates 30s. per ton (9½d. per bush.). Parcels, Port Adelaide to London-Liverpool, 25s. per ton (8d. per bush.); Port Adelaide to Melbourne, 9s. per ton (2½d. per bush.); to Sydney, 11s. 6d. per ton (3½d. per bush.).

SAILER FREIGHTS.—From South Australia to United Kingdom-Continent, 28s. to 28s. 9d. per ton (9d. to 9½d. per bush.); to South Africa, 22s. 6d. per ton (7½d. per bush.).

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on January 1st—

BUTTER.

The weather during the month of December has been very changeable, and in consequence the supply of cream has been somewhat irregular. The quality of the butter has been well maintained, and the prices have remained the same as last month, viz., superfine, 1s. 3½d.; pure creamery, 1s. 2½d.

A. W. Sandford & Co., Limited, report on January 1st—

BUTTER.—Favorable weather was experienced during December, which assisted dairy folks to forward their cream and market butter in nice order, and with the approach of Christmas a strong demand set in. This kept the rooms well cleared at full rates for top grades of factory, creamery, separator, and dairy butters, whilst stores and collectors' lines experienced a sharp advance. Best factory and creamery, fresh in prints, from 1s. 1d. to 1s. 3½d. per lb.; choice separators and dairies, from 1s. to 1s. 1d.; medium quality lots, 10d. to 11d.; stores and collectors', 9d. to 10d.

EGGS.—Under the influence of heavy inquiry for metropolitan as well as oversea trade prices kept up, and an advance was established during the month. Prime guaranteed new-laid full-sized hen eggs realised 9d. per doz.; duck, 9½d.

CHEESE.—A very heavy turnover was effected. South Australian factory makes are now well established on the western market, and this, coupled with good South Australian quittances, checked the lowering in selling rates, prices now being disposed to firm. New makes, from 5½d. to 6½d. for large to loaf.

BACON.—What was possibly a record business was put through in December. Established brands of factory sides, middles, and rolls sold well, and the market was cleared of Christmas hams. Best factory-cured sides, from 7d. to 7½d. per lb.; middles, 7d. to 8d.

HAMS.—In calico, 11½d. per lb.

LARD.—In skins, 6d.; bulk, 5½d. per lb.

HONEY.—The new take is later in coming in this year. A heavy call, however, rules for all consignments of prime clear extracted at 3d. per lb. Beeswax is very saleable at 1s. 3d.

LIVE POULTRY.—Throughout the month poulterers, restaurant-keepers, and others purchased freely so as to secure as early as possible their Christmas requirements; consequently spirited competition ruled, and, although the forwardings in quantities far exceeded any previous December, supplies were readily cleared at higher average rates than formerly. Heavy-weight table roosters were worth 3s. 6d. to 4s. each; nice conditioned cockerels, 2s. 6d. to 3s. 3d.; hens, 1s. 9d. to 2s. 3d.; ducks, 1s. 9d. to 2s. 9d.; geese, 3s. to 4s.; pigeons, 6d.; turkeys, from 6d. to 1s. per lb. live weight for fattening; prime table birds.

POTATOES.—From the plains near Adelaide the new season's potatoes controlled the market, but towards the last days of the month early Gambiers as well as Victorians were offering. This is having a steadying effect on selling rates, and the trend now is towards easing. Present quotations are from 8s. 6d. to 9s. per cwt.

ONIONS.—The dry winter is responsible for shortage in yields, and, owing to this and the heavy demand, values are disposed to firm. Present quotations, 9s. per cwt.

RAINFALL TABLE.

The following table shows the rainfall for December, 1911, at the undermentioned stations, also the average annual rainfall and the total for the years 1911 and 1910, respectively:—

Station.	For Dec., 1911.	Average Annual.	Year, 1911.	Year, 1910.	Station.	For Dec., 1911.	Average Annual.	Year, 1911.	Year, 1910.
Adelaide	1.46	20.55	15.99	24.62	Hamley Bridge	1.11	16.48	13.10	21.08
Hawker	3.47	12.13	11.23	15.53	Kapunda	1.33	19.71	14.79	24.97
Cradock	2.68	10.69	9.48	15.55	Freeling	1.10	17.85	13.49	23.94
Wilson	2.35	11.68	8.75	18.30	Stockwell ...	1.71	20.29	16.23	24.66
Gordon	1.80	9.91	9.75	14.42	Nuriootpa ...	1.95	21.37	14.33	26.74
Quorn	0.73	13.75	7.97	18.51	Angaston ...	1.72	21.96	20.68	29.75
Port Augusta	0.56	9.62	7.09	17.52	Tanunda	1.47	21.95	21.25	30.86
Port Germein	1.88	12.62	12.01	20.66	Lyndoch ...	1.87	23.05	18.75	28.17
Port Pirie ...	1.27	12.86	12.75	25.40	Mallala	1.17	16.86	14.64	22.53
Crystal Brook	0.91	15.42	14.40	23.24	Roseworthy .	1.29	17.39	12.51	23.63
Pt. Broughton	1.10	14.19	13.83	20.06	Gawler	1.38	19.26	13.20	24.58
Bute	1.00	15.22	14.89	23.81	Smithfield ...	1.10	17.24	12.49	23.31
Hammond ..	1.19	11.22	9.32	18.59	Two Wells ...	1.29	16.51	11.91	20.74
Bruce	0.95	9.50	7.33	17.35	Virginia	1.55	17.57	13.12	24.24
Wilmington .	1.52	18.06	15.46	26.06	Salisbury	1.23	18.45	16.06	25.39
Melrose	1.79	23.03	17.26	31.94	Teatree Gully	1.53	28.64	19.00	33.35
Booleroo Cntr	1.14	15.94	10.33	21.41	Magill	1.49	25.94	16.17	28.39
Wirrabara ...	1.63	18.74	14.02	28.45	Mitcham ...	1.43	23.80	17.80	24.77
Appila	2.46	14.87	13.41	25.33	Crafrers	2.90	46.65	41.21	55.80
Laura	1.70	18.02	15.12	30.02	Clarendon ...	1.76	33.86	28.58	37.33
Caltowie	1.18	17.19	15.24	23.70	Morphett Vale	1.69	23.50	20.23	27.13
Jamestown ...	1.35	17.21	17.05	23.83	Noarlunga ...	1.62	20.23	19.56	25.54
Gladstone ..	1.65	15.84	14.84	23.09	Willunga	2.41	25.86	26.67	34.83
Georgetown ..	2.28	18.10	16.87	27.72	Aldinga	1.80	20.33	18.49	27.16
Narridy	1.06	16.83	15.20	21.08	Normanville .	1.47	20.57	18.12	30.50
Redhill	0.75	16.62	10.12	26.64	Yankalilla ...	1.62	21.95	23.87	38.86
Koolunga ...	1.23	15.73	13.34	25.51	Eudunda	1.39	17.06	15.39	27.84
Carrieton ...	1.90	12.03	10.97	19.70	Sutherlands .	2.24	10.26	10.34	15.94
Eurelia	1.13	13.14	10.13	19.52	Truro	2.05	19.49	16.85	26.51
Johnsburg ...	2.45	9.96	9.74	16.44	Palmer	0.62	15.26	10.98	21.80
Orroroo	0.79	13.41	8.55	18.88	Mt. Pleasant .	1.08	26.88	21.00	33.23
Black Rock ..	1.02	12.13	9.38	19.63	Blumberg	1.03	29.65	21.91	35.00
Petersburg ..	1.58	12.96	11.17	16.96	Gumeracha ...	1.44	33.36	25.37	39.69
Yongala	1.37	13.83	12.29	19.10	Lobethal	1.43	35.74	26.88	38.16
Terowie	1.98	13.56	11.31	21.16	Woodside	1.70	31.74	27.38	38.55
Yarowie	2.07	13.66	13.34	22.32	Hahndorf ...	1.31	35.61	30.85	41.35
Hallett	1.73	16.35	14.28	20.47	Nairne	1.11	28.89	26.15	35.00
Mount Bryan	1.51	15.59	13.04	21.28	Mt. Barker ...	1.41	30.96	28.70	35.44
Burra	2.43	17.72	16.36	24.81	Echunga	1.55	32.77	30.86	41.26
Snowtown ...	1.66	15.72	11.87	21.86	Macclesfield .	1.28	30.68	27.24	40.36
Brinkworth ...	2.43	15.68	14.56	22.00	Meadows ...	1.86	35.47	32.85	43.93
Blyth	1.24	16.28	15.77	21.71	Strathalbyn .	1.21	19.13	19.87	28.01
Clare	1.61	24.30	20.98	31.63	Callington ...	0.61	15.82	12.48	19.63
Mintaro Cntrl.	1.16	22.16	18.86	26.62	Langhorne's B	1.09	15.41	12.86	19.50
Watervale ...	1.17	27.42	21.98	31.07	Mflang	1.30	16.40	11.25	17.46
Anburn	1.00	24.30	19.37	34.03	Wallaroo	1.21	13.86	15.69	20.45
Manoora	1.51	18.29	14.21	22.59	Kadina	1.22	15.82	14.85	19.72
Hoyleton	1.11	18.11	14.95	21.22	Moonta	1.33	15.22	14.00	17.22
Balaklava ...	1.34	16.00	14.49	22.42	Green's Pms. .	0.89	15.94	11.27	19.70
Pt. Wakefield	1.01	12.98	15.72	17.65	Maitland	1.08	20.19	18.41	22.80
Saddleworth .	1.09	19.85	14.21	23.62	Ardrossan ...	1.21	13.82	12.74	17.78
Marrabel	0.97	19.24	12.43	23.28	Pt. Victoria ..	1.56	15.12	16.40	17.54
Riverton	1.29	20.54	16.45	27.02	Curramulka .	1.03	18.55	15.66	24.74
Tarlee	1.43	17.51	13.06	23.16	Minlaton	1.70	17.41	15.86	22.06
Stockport ...	1.54	15.98	12.01	18.90	Stansbury ..	1.73	16.92	17.01	21.96

RAINFALL TABLE—*continued.*

Station.	For Dec., 1911.	A'v'ge. Annual.	Year, 1911.	Year, 1910.	Station.	For Dec., 1911.	Annual. A'v'ge.	Year, 1911.	Year, 1910.
Warooka....	1.99	17.47	22.33	23.54	Bordertown .	1.88	19.94	15.16	21.35
Yorke town .	1.60	17.36	17.51	23.21	Wolseley....	1.82	17.80	13.69	22.71
Edithburgh..	1.70	16.39	15.73	23.36	Frances.....	3.25	20.55	20.11	25.50
Fowler's Bay.	0.23	12.15	12.61	12.23	Naracoorte .	3.01	22.49	21.15	28.30
Streaky Bay.	2.48	15.17	18.10	17.60	Lucindale ...	3.12	22.99	23.30	31.05
Pt. Elliot... .	2.05	16.13	19.78	20.96	Penola.....	2.74	26.72	24.13	33.67
Pt. Lincoln..	1.63	19.79	18.54	25.18	Millicent	2.95	28.93	32.69	38.55
Cowell	0.53	11.78	10.87	13.10	Mt. Gambier.	2.72	31.76	33.75	44.19
Queenscliffe .	1.49	18.31	21.33	—	Wellington ..	1.24	15.08	12.17	19.53
Pt. Elliot....	1.25	20.37	17.61	25.11	Murray Bridge	0.45	14.32	10.56	21.49
Goolwa	1.68	17.74	18.92	26.09	Mannum ...	0.54	11.64	7.35	19.12
Meningie.....	1.51	18.92	15.58	23.11	Morgan	2.68	9.15	9.87	13.31
Kingston....	3.95	24.37	24.80	31.45	Overland Crnr	1.78	11.27	11.72	17.70
Robe	1.91	24.63	23.05	32.30	Renmark ...	1.77	10.80	10.62	14.97
Beachport....	2.70	27.17	29.63	39.81	Lameroo ...	2.14	16.36	15.63	19.25
Coonalpyn ..	1.24	17.64	14.51	18.61					

TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of 3,300 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Jan.	Feb.			Jan.	Feb.
Amyton	*	—	—	Millicent	692	9	13
Angaston	*	—	3	Miltalie	*	—	3
Appila-Yarrowie	*	—	—	Minlaton	†	6	10
Arden Vale & Wyacca	*	—	—	Mitchell	*	6	3
Arthurton	684	—	—	Monarto South	686	—	—
Balaklava	*	—	—	Monteith	*	—	—
Beetaloo Valley	*	—	3	Moonta	*	—	—
Belalie North	*	9	13	Moorlands	*	—	—
Blyth	*	—	—	Morchard	676	—	—
Bowhill	*	4	29	Morgan	687	—	—
Bowmans	*	—	—	Morphett Vale	691	—	—
Bute	*	—	—	Mount Bryan	*	—	—
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Crystal Brook	*	—	3	Paskeville	*	—	29
Cummins	*	—	—	Penola	*	6	3
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Dawson	676	—	—	Petina	*	—	—
Dingabledinga	*	12	9	Pine Forest	*	2	27
Dowlingville	*	—	—	Port Broughton	*	—	2
Elbow Hill	*	—	—	Port Elliot	*	20	17
Forest Range	689	4	29	Port Germein	682	—	—
Forster	*	—	—	Port Pirie	*	—	—
Frances	*	—	—	Quorn	*	—	—
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Georgetown	*	27	24	Riverton	*	—	—
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Mallala	*	—	5	Woodside	*	—	—
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Meadows	*	—	—	Yongala Vale	682	—	3
Meningie	691	6	3	Yorketown	*	13	10

* No report received during the month of December. † Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by GEORGE G. NICHOLLS.

UPPER-NORTH DISTRICT. (PETERSBURG AND NORTHWARD)

Dawson, November 11.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. Meyers (chair), Wilson, Quinn, Baker, Ferguson, Burden, and Nottle (Hon. Sec.).

LE HUGUENOT WHEAT.—Members reported that this variety of wheat had been grown in the district with very good results. This year, however, they found it generally very thin, which they attributed to the lighter rainfall experienced.

THE EFFECT OF GRASSHOPPERS ON POULTRY.—Mr. Ferguson pointed out that since grasshoppers had made their appearance his fowls, which were previously in good condition and laying well, fell away considerably and ceased laying. Other members mentioned that they had had similar experience.

POULTRY TICK.—The Chairman stated that he found tick most troublesome in August, just when the weather began to warm up. A little butter and pepper rubbed into the affected parts of the fowl generally removed the pest. [Very thorough steps should be taken to the tick out of the yards and houses or the fowls will soon be attacked again. —ED.]

POISONING MICE.—Members agreed in the opinion that the best means of poisoning mice was with the aid of oats and strychnine.

Morchard, December 9.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. E. J. Kitto (chair), W. H. W., and H. A. Toop, McDougal, Kupke, Scriven, jun., Munro, Rafferty, Laskey, Muller, Jasper, Parsons, R. Kitto, and McCallum (Hon. Sec.).

HARVESTER, STRIPPER, AND MOTOR WINNOWER.—Mr. T. H. Muller contributed a paper on this subject, in which he said that although the harvester was a splendid machine it had its disadvantages. In the first place, it did not save the cocky chaff, and in bad seasons this was valuable, as mixed with bran and molasses it made good feed for cows. In cold weather it made good sheep feed. The harvester also scattered the seed of weeds and blew out a considerable percentage of light grain. It required a larger team than the other machines for harvesting, and, in addition, on rough ground it was very short-lived. An up-to-date stripper would reap a larger area per day, and would show a better sample of grain. The harvester was only suitable for level country. Then there was the difficulty of securing capable men to drive it. Four men, with two strippers and a motor winnower would do more in a day than four men with three harvesters. In the discussion which followed the reading of the paper Mr. W. H. Toop said as much light grain was blown out by the winnower as was lost with the harvester. Mr. J. Scriven agreed generally with the views expressed in the paper, but could not see how the winnower should clean the grain better than the harvester if it received due attention. Mr. H. A. Toop favored the harvester, but Mr. Munro was opposed to their use on the grounds that they shook to pieces in such a short time. Mr. Kupke prophesied that the motor winnower and stripper would be substituted for the harvester in a great many cases in the near future.

Warcowie, November 3.

PRESENT.—Messrs. Donnellan (chair), Telfer, F. and W. Crossman, Bairstow, E. and W. Sanders, Hilder, P. and J. Duffy, Feineler (Hon. Sec.), and six visitors.

HARVESTER v. STRIPPER.—A discussion on the relative advantages of the harvester and stripper was initiated by the Hon. Secretary, who expressed the view that in this

part of the North, where each farmer had a large area under crop, and generally the yield was light, it was not advisable to use the combined harvester. It was preferable to gather the crop with the stripper and clean with the motor winnower. After the wheat was cleaned the engine could be used for driving the chaffcutter, corncrusher, water-pumping, sawing wood, &c. Other members agreed with the view of the Hon. Secretary, and thought that on large farms the stripper and motor winnower were to be preferred, on account of the saving of the cocky chaff, which frequently proved valuable.

HUGUENOT WHEAT FOR HAY.—The Hon. Secretary tabled a sample of hay cut from Huguenot wheat sown during the first week in June in sandy soil. In spite of the dry season it reached a height of about 4ft. 6in. and cut about 1½ tons of hay to the acre. Other varieties of wheat sown at the same time only grew to a height of about 18in., and did not cut above three-quarters of a ton of hay to the acre.

Willowie, October 31:

PRESENT.—Messrs. Hawke (chair), Stone, D., L., S., and J. McCallum, Schmidt, S. C. and W. R. Greig, Howard, Bristow, Blight, Hughes, A. and F. Gray, Basley, Bauer, Foulis (Hon. Sec.), representatives from the Morehead and Amyton Branches, and a number of visitors.

EXPORT LAMB-RAISING IN CONJUNCTION WITH WHEAT-GROWING.—An enthusiastic debate on this subject took place. Mr. W. P. Foulis, in opening the discussion, said he firmly believed that lamb-raising for export was profitable when combined with agricultural pursuits. In a district where the rainfall was uncertain it was unwise to depend solely on wheat-growing for an income. Wheat-growing should be made the chief means, with horse-breeding, dairying, poultry-farming, fattening of stock, and raising of lambs for export as secondary industries. He would take as his basis a farm of 640 acres, and would give figures of a year's transactions in the raising of lambs in order to prove the profit to be secured from lamb-raising in conjunction with wheat-growing. In October the farmer would have a trifle over 200 acres each of grass, crop, and fallow. Sixty ewes was quite sufficient for a farm of this area. From October until after harvest there would be 200 acres of grass on which to graze the stock. After harvest and up till fallowing there would be 400 acres upon which the stock could run. The rubbish grew so quickly upon the fallow that there would be almost 400 acres upon which the stock would pasture right up till the following October. In April there should be about 50 or 60 lambs. In the average season 50 of these would be matured for freezing in September and should net about 9s. per head, or a total of £22 10s. Each ewe should cut 8lbs. of wool, valued at 7d. per pound, and deducting 1s. per head for expenses, this left 3s. 8d. per ewe for wool, a total of £11—a grand total of £33 10s. for the year. Deducting the loss of two ewes at 15s. each, and a depreciation in value of ewes of 2s. per head on account of age, a total of £7 6s., there was a clear profit of £26 4s. on the year's transaction. This was made on a farm of 640 acres, worked to its best wheat-producing capacity. Some people kept sheep merely for the wool they produced. The ewes paid for themselves in this way, and in addition there was a lamb raised in five months that would net 9s. There was no other way in which grass could be made to give such a splendid return in so short a time. The raising of lambs fitted in well with the other agricultural pursuits. In April, when the grass was young and tender, the lambs were in the same state, and this grass was just what they required. As the grass grew the lambs grew also; and in September, when they were wanted at their best, the feed was in the very best state to top them off. With other stock this was not the case. They had to be fattened in the spring and then held over through the summer, when feed and water were often scarce, and they were sold in the winter at a time when it was hard to keep them in condition. During a period of four years Messrs. Greig Bros. sold for freezing 909 lambs, for which they received an average of 10s. 8d. per head clear profit. Their estate had an area of 2,100 acres, one-third of which was cropped. What these gentlemen had done others could do if they worked on the same lines. There was a vast difference in raising lambs for export purposes and merely raising lambs in the ordinary way. The man who was raising lambs for export required to have that idea centred in his mind from the beginning. The man who bred the pure Merino was not raising the best type of lambs for freezing. The Dorset Horn-Merino and the Shropshire-Merino would realise 2s. more per head than the pure Merino reared under the same conditions. Lambs intended for freezers required careful attention, but not necessarily more labor bestowed on them. They should be shifted from paddock to paddock, and should not be allowed to go hungry for a single day if it could possibly be avoided. Even though the feed was good a change

was beneficial. He advised the cropping with wheat of one-third of the farm as the chief source of income with the raising of lambs for export as a secondary industry by which the income could be added to. Mr. S. G. McCallum said lamb-raising in conjunction with agriculture was not profitable. If a farmer wished to secure the greatest return from his farm he must cultivate his land well so as to give the crop every possible advantage. If this was done he would find that there would be very little (if any) surplus feed for sheep. It was well known that one could secure a much larger income by cultivating the land than by grazing it. Suppose a farmer owned 1,000 acres of land; he was able to keep 400 ewes upon his farm; these ewes would rear 350 lambs for export purposes; this meant that he would have 750 sheep for five months of the year and 400 during the remaining seven months; this would be the outside number he could keep on the area stated; 350 lambs at 10s. per head gave £175, and 400 ewes' fleeces at 5s. per fleece another £100, so that the total income for the year would be £275. By cultivating his farm, without keeping any sheep, he would be able to crop 500 acres of fallow each year. When members were discussing the average wheat yield per acre the majority considered that good fallow ground, if manured, should at least average 12bush., and it was upon this average that he worked. Cropping once in three years would be advocated; but Roseworthy College experiments, and also the experience of farmers in this district, had proved this to be a failure. Not only did it allow the land to become dirty, but it ploughed up rough and cloddy and needed much more working to secure a good seedbed. Generally speaking, the stubble fallow was the greatest yielder, that was, unless the land had been left open for a number of years. Five hundred acres at 12bush. or four bags to the acre equalled 2,000 bags of wheat, which, at 3s. per bushel, or 9s. a bag, amounted to £900. Working expenses for the year were—Fallowing, at 4s. per acre; cultivating, with light harrow attached, twice in springtime, 1s. 6d. each time; cultivating before drill, 1s. 6d.; drilling and harrowing, 1s. 6d.—amounting to 10s. per acre. Further, there would be 1bush. of seed wheat per acre at 3s. and 56lbs. of superphosphates at £4 per ton, or 2s. per acre. Harvesting and wheat sacks would cost another 3s. per acre, making the total expenses of working 18s. per acre. Five hundred acres at 18s. amounted to £450; this deducted from £900 gave a net income of £450 as against £275 from lamb-raising. This showed that by cultivating the land one got over one-half more clear profit than by grazing. Those who advocated the keeping of ewes only intended to keep a sufficient number to eat surplus feed, and keep down the rubbish and weeds growing upon fallow land. Ewes rearing lambs for export purposes were not suitable for eating surplus feed of any kind; they might help to do this, but they must be kept on good feed. If the feed was short the lambs would become stunted. Lambs must be fit for the freezers before the end of September if best values were expected for them. Usually it was after this time that the rubbish grew most rapidly on fallow, so the lambs were of very little use in springtime. He preferred keeping wethers, if any class of sheep was to be kept. They were suitable for eating surplus feed, and when it was good they would improve in condition; when it was short, they would lose a little fat, but their wool continued to grow. He was convinced that it did not pay to allow rubbish or weeds to grow upon the land that was ploughed up as fallow. It was nearly as bad as cropping the land every year. He considered that by fallowing early and cultivating first in early spring, then again close up to harvest time, one would be able to kill the weeds and rubbish before they had harmed the land to anything like the same extent, as if allowed to grow on until springtime, with a flock of sheep to keep them from running up to seed. From grazing one received an income of £275 from 1,000 acres of land, or 5s. 6d. profit per acre. By combining lamb-raising with agriculture the farmer could still crop his 500 acres. However much he saved his stubble, and even if he left his fallow land to grow feed right on until late in the spring, he would not be able to keep any more than half the number of sheep before mentioned, allowing that he could keep as many sheep on a stubble paddock as on good grass land. His fallow would need to grow just as much feed as if it was never worked at all. No farmer would think of allowing this. In this way his sheep would only bring in an income of 5s. 6d. per acre on his wheat crop, or, in other words, his crop would be equal to an average of 2bush. less than the crop on fallow that had been worked well. Farmers knew that, generally speaking, well-worked good fallow land yielded, in many cases, 5bush., 6bush., or 7bush. more to the acre than land not so treated. It cost very little more to harvest a good crop than an inferior one, and he contended that cultivation only undoubtedly brought in a much larger revenue to the State as well as the individual than a combination of cultivation with lamb-raising for export. Mr. L. McCallum said lamb-raising paid from the beginning. The profits were certain, and even under the most adverse circumstances a return was assured. Lambs cost practically nothing in the first place, and what one realised was almost all clear profit; 9s. and 10s. per head

and sometimes more was obtained above expenses. He strongly favored cropping in rotation, and considered that, in the long-run, quite one-third more would be reaped off land cropped every third year than would be taken off land cropped every other year. Lamb-raising often proved a failure because farmers overstocked. This was a great mistake. It was preferable to understock. He favored mixed farming, and would not depend solely on wheat-growing. Lamb-raising was a most profitable secondary industry. Mr. B. E. Schmidt contended that lamb-raising on farms where wheat was grown with success under the up-to-date system of dry farming resulted in a direct loss to the farmer. The majority of farmers not only looked for profit from the sale of lambs, but also from the use of sheep for feeding off fallow land. But ewes kept for breeding purposes could not be expected to clean fallow land with any success, for just at the time the fallow was most likely to be in a bad state the lambs were reaching maturity and needed to be kept on the very best feed procurable. This meant that if the farmer had not sufficient time and strength to work over all his fallow, a big proportion of the rubbish went to seed, or the quality of the lambs was sacrificed. He would not do away with sheep altogether, but suggested that every farmer should keep a certain number of wethers; these could be turned on the fallow when required and left there until the feed had disappeared. This class of sheep would fatten on less feed than any other, and at any time the farmer wished he might get rid of them as fats at a good price and buy again in a cheaper market. The direct loss through keeping ewes and lambs occurred when a man, farming on a fairly large scale, set to work to fallow, say, 700 acres. Toward the close of fallowing he experienced a rather dry spell and found himself getting rather short of feed for his ewes and lambs. The result was very often he left a part of a paddock, perhaps 200 acres, unfallowed, so as to be able to fatten his lambs. At seeding time he made up for this by putting in 100 acres of stubble land. At the end of the season he received a nice little cheque for lambs, but was unmindful of his loss through neglecting to fallow the usual quantity of land. The 200 acres of fallow would have returned five bags per acre, equal to 1,000 bags. The 100 acres of stubble only yielded three bags per acre, equalling 300 bags, and leaving a loss of 700 bags, which at 10s. per bag amounted to £350. Taking from this the average profit made on 400 ewes, approximately £230, left the farmer with a direct loss of £120. He had not the slightest doubt that lamb-raising for export purposes resulted in a direct loss where wheat-growing could be successfully carried on. After the addresses had been delivered, a vote was taken on the question, which showed a large majority in favor of lamb-raising combined with agriculture.

Wilmington.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Hannagan (chair), Hill, Schuppan, Zimmermann, Noll, Gloede, Litchfield, and Jericho (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Considerable discussion took place on this subject. Mr. Litchfield thought there was no necessity to alter the present method of selling cattle, which appeared to be quite satisfactory. Salesmen, owners, and buyers were generally good judges of weight and value, and nothing would be gained by introducing the suggested system. This would result in a loss of time, extra expense would be incurred in connection with the erection of weighbridges, and extra labor would be necessary for weighing. Market value only could be obtained, whether the beasts were sold by actual weight or under the hammer, and the supply and demand varied from time to time. Members generally agreed that the present was the most simple and the best method of selling fat cattle.

"*SALVATION JANE.*"—The following paper was read by Mr. Litchfield:—"Last season I went to considerable trouble and labor in cutting down every plant of 'Salvation Jane' on a portion of my farm along the Valley Creek, under the impression that it had been declared a noxious weed. This season there was more 'Salvation Jane' than before on the same ground, owing to the seed washing down the creek, or blowing in from a neighbor's paddock. When shearing early in September this year, when all the native grasses were still quite green, I put the sheep on this part of the farm and they ate the weed quite greedily, apparently preferring it to all other fodder; and although some of the plants were from 2ft. to 3ft. high, they trimmed and left only the stalks as far as they could reach. To my mind a point in favor of this plant as sheep feed is that it is still green long after all other native grasses and herbage are dry. It is well known how essential it is for the well-being of our sheep to have green feed for them at all times

possible. 'Salvation Jane,' as we have it locally, should not be a noxious weed. In other districts the weed may have different characteristics. I am not aware whether the plant is detrimental so far as wheat-growing is concerned."

STABLE MANURE.—Mr. Zimmermann dealt with this subject in a paper in which he said he had, during three successive seasons, conducted experiments with the application of stable manure. He had a paddock subdivided into three, which he sowed with wheat and cut for hay. Continuing, the paper said—"The first year (1909) I spread from the dray about 20 tons of stable manure to the acre, half of which was fresh horse manure and the other half well rotted. I ploughed it in immediately after spreading, with the result that the wheat grew very rank in the early part of the year. Later, clover made its appearance, and the result was a comparatively poor cut. The second year (1910) I treated the plot similarly, with the result that the clover grew more vigorously than was the case with the first year, on account of the manure being brought too near the surface. The cut was about three-quarters of a ton per acre as against 1 ton the year before. In 1911 (the third year) I treated the plot the same as previously, but the rainfall was considerably less; the result was about 3 tons per acre, with the clover crop very poor. Plot No. 2, first cropped during 1910, was treated in a manner similar to that of the plot referred to above. The wheat crop was very poor, and I was unable to get through the clover with the binder. In the second year (1911) alongside of plot No. 1 one could see the difference to the very drill marks. The clover was nearly a foot high, and during the year there was little rain. Plot No. 3, manured fallow land, was treated with a heavier dressing of horse manure, and was sown at the end of June with little rainfall. The manure was ploughed in just before seeding similarly to the other plots, and a very heavy crop, free from clover, was secured."

Wirrabara, December 2.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. P. J. Curnow (chair), C. H. Curnow, Kendrick, Borgas, Pitman, Marnar, Kavanagh, E. J., W. H., and W. Stevens, Lawson, Hollett, Bowman, Thistleton, Hoskins, and Woodlands (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—Consideration was given to the proposal to substitute the system of weighing wheat in bulk for that at present in vogue, as a result of which the Branch expressed an opinion in favor of the change.

CARE OF FARM ANIMALS.—This subject was dealt with in a paper by Mr. W. H. Stevens, in which he said that for stabling horses he preferred a straw-roofed building, as it maintained a more even temperature than an iron-roofed stable. He would not at all times have water in the yard with the horses, but thought it advisable that the horses should have access to water during the night, as he found they then drank less directly after working. Where a dam was used care should be taken to prevent water from the stable running into it. The most serviceable winter shelter for cows was a straw stack. It provided excellent protection and would be freely eaten by the cows in very wet weather. Sheep as a general rule did not require the special provision of shelter. A profitable discussion followed the reading of the paper. Members agreed that it paid to rug cows, and that a straw stack was an excellent shelter for stock during winter.

HUGUENOT FOR HAY.—A discussion was initiated on the subject of the suitability of Huguenot wheat for hay. Members concurred in the opinion that, provided it was sown very thickly, it was a good hay wheat.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Leighton, December 2.

PRESENT.—J. McDonald, Warner, Goodridge, Fairchild, Bailey, McWaters, (Hon. Sec.), and four visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—A discussion took place with regard to the proposal to institute the system of selling cattle by live weight. After due consideration, members decided to afford the idea their support.

Farm Laborers' Block.—After consideration had been given to the proposal to survey small blocks for farm laborers in new hundreds the Branch decided to support the scheme.

HANDLING YOUNG HORSES.—This subject was dealt with in a paper by the Hon. Secretary, who said it was unwise to handle colts until they were about 2½ years old. At this age the colt would be ready for light work, and should be yarded in a good strong yard, say, 25ft. square. He should be rubbed down with a bag tied to a 10ft. pole, and handled when sufficiently quiet. Then the halter could be put on him by using the pole referred to, with one nail driven in the end and another about 14in. therefrom, the halter being hung on these and dropped over his head. After being thus secured, he should be tied to a strong post with a rope attached in the following manner:—A surcingle, on which was a ring to come under his body, should be put around him. Then a strap with a ring on it should be put on his off front leg. A light rope should be tied to his near leg, and the end run through the ring in the surcingle, through the ring on the off front leg, and back through the ring on the surcingle. By this method a double purchase on his front legs was secured. If colts were tied with a rope round the neck there was a danger of the windpipe being injured. For mouthing, he would use a straight bit, with reins attached to the surcingle, just tight enough for the animal to feel the pull on the bit. This gear should be left on for two hours per day over a period of three days, after which the colt could be placed in a good quiet team. In the discussion which followed the reading of the paper, Mr. McDonald said foals should be handled before they were weaned. Mr. Bailey expressed the view that a circular yard was preferable for handling colts, and Mr. Warnes believed in tying a colt by the neck, considering that no harm was done by this practice.

Mount Bryan East, December 2.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. J. Thomas, jun. (chair), Gare, Doyle, F. and R. Thomas, Hughes, and Quinn (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—After duly considering the proposal to substitute the system of weighing wheat in bulk for that in present in vogue, it was decided to give it the support of the Branch.

RAISING LAMBS FOR EXPORT.—This subject was dealt with in the following paper by the Chairman:—"The fat lamb industry in South Australia is well established and is gradually expanding, and there are present indications that in the near future Italy, France, Austria, and Germany, as well as other places, will require considerable quantities of our frozen meat. Prejudices have had to be overcome; but now it can be said that the trade has a good hold in the old world. So much so that the immense population of Great Britain depends largely on this source for its food supplies, and the price of mutton is now within the reach of the average worker. It so happens that our climatic conditions are most suitable for the production of fat lambs for the English markets. Here housing and hand-feeding are almost unknown, and consequently but comparatively little labor is required in management once the run is established. There is no royal road to success in the business but careful attention to details, being observant, and in a general way striving to adopt the best and latest methods in producing a first-class lamb for the London market should be the aim of the grower. The breed of sheep most favored in this district is the Merino. They grow to large frames, and carry both a good quantity and quality of wool. The breed is also used extensively with the British breeds for crossing purposes. The Shropshire ram has been used with good results, but of late years this breed has been carrying too much wool on the head and face. It appears that this fault has developed as a result of sheep of this type being taken as typical of the cross. Lambs that carry wool about the head are invariably the worst doers. A lamb with a clean face and with the least leather possible comes out on top every time. With a view to improving both the lambs and the wool I purchased six English Leicester rams last year. This experiment gave very encouraging results, the lambs being very attractive and shapely, carrying a top-knot of wool with a nice, clean, open face. A portion of the Shropshire cross was running together with the Leicester cross and was grown under similar conditions, the quality being much about the same, although the proportion of rejects was larger with the Shropshire cross than with the Leicesters. Some 400 ewes were put to the Leicesters and not a single mishap was known to have taken place in the lambing, which must be regarded as phenomenal. A feature of the breed is that they have fine heads, and the remarkably successful lambing must be attributed to this fact. The result being so satisfactory, 10 more Leicesters were purchased this year. I visited the freezing works

at Port Adelaide, where I had 874 fat lambs slaughtered and shipped on my own account. As a fair proportion of this number were Leicester cross, the balance Shropshire cross, useful information was gained by witnessing the killing, as I was able to see each lamb divested of its skin. The Leicester cross here again looked most attractive, the carcass being shapely with a good color; the dock, though not so thick as with the Shropshire cross, gave the hind-quarters rather a better appearance. Breeders would do well to visit the works when they have lambs going through, as the experience gained would be invaluable in connection with their future operations. The department encourages these visits, and the officers are only too pleased to impart valuable information to the grower. The working of the establishment is done quickly, and the good order and discipline that characterises the whole business speaks volumes for its management. The gentlemen connected with the various offices are found to be exceedingly courteous and obliging, every man doing his duty with the right man in the right place. Such is the favorable impression given by a visit to the freezing works. The class of ewe that has proved most valuable in this district for raising fat lambs is the Lincoln Merino, but as they are in such good demand it is difficult to procure a well-bred lot of ewes. The next best is the large-framed Merino, those carrying the least leather being most desirable, as the shape and style is invariably stamped on the offspring. As to the best time at which to start the lambing opinions vary. Some prefer the early lamb, and when the season is early it is allright and a good price can be relied on, but if the autumn rains are not seasonable the early lamb has lost its chance of becoming a prime freezer. The ewe never gets the flush of milk and will dry off before the lamb is fit. A good supply of milk from the beginning until the lamb is weaned is of the utmost importance for the rapid growth of the freezer, which should maintain its bloom, which term is understood by the trade as a ripe quality. Lambs grown in this way will develop good weights at ages varying from four to five months."

Port Germein, November 18.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Hacket (chair), Holman, Crittenden, Head, Glasson, Stone, Blesing, Deer, and Turner.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—Due consideration was given to the proposal to institute the system of weighing wheat in bulk. Mr. Holman could not see that any advantage would accrue, or that there would be a saving of time if the scheme was adopted. Mr. Blesing said special weighbridges would be necessary, which would have to be tested every day. He had known of cases where there was a variation of 5cwts. between the weights registered for a load on two different bridges. Dispatch of business would not be secured, as it was necessary to handle each bag separately when unloading. Members generally said merchants as a rule gave the buyers full weights, and it was decided that the Branch should not support the proposal.

Yongala Vale, December 2.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. Lloyde (chair), Battersby, C. and E. Fowler, Wedding, Keatley, Schmidt (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—The matters referred from Congress to the various Branches for consideration, viz.—farm laborers' blocks, selling cattle by live weight, and weighing wheat in bulk—were duly discussed. The proposals did not commend themselves to members, and it was decided not to give them the support of the Branch.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Clare, December 1.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. McKenzie (chair), J. H. Knappstein, Daly, Pink, Dux, Radford, Taylor, Evans, Neate, Walker, Forbes, Chambers, Pascoe, Keane, Pycroft, Dunstan, Coward, Mayor, Hill, Victorson, Nolan, P. A. Knappstein (Hon. Sec.), and two visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—Considerable discussion took place relative to the proposal to institute the system of weighing wheat in bulk. It was decided to secure information from States where the system obtained before the Branch would give an expression of opinion on the matter.

Clare, December 9.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. McKenzie (chair), Patullo, Hill, O., J. H., and P. Knappstein, A. Dunstan, F. W. H. Lee, Keane, Daly, Mayor, Radford, Jarman, Berridge, Nolan, Victorsen, Hicks, and Scott (Hon. Sec.).

HOMESTEAD MEETING.—The homestead of Messrs. Knappstein was visited, and the orchard, vineyard, and crops were inspected. Duchess pears and Cleopatra apples were yielding fine crops. Members were much interested in the power spray pump, which was explained to them. With two men 700galls. of spray per day could be distributed, whereas with the hand pump three men could not deal with more than 420galls. a day. A stack of wheaten hay, Marshall's No. 3 and Le Huguenot, which had been cut off 19 acres of ground, contained about 60 tons, and on a crop of 40 acres of field peas 1,200 store lambs were being fattened for market.

Salisbury, November 7.

PRESENT.—Messrs. Harvey (chair), Heier, McGlashan, Shepherdson, Cooper, Neal, Hooper, Kuhlman, Baylis, Mueller, and Jenkins (Hon. Sec.).

FOLLOWING.—Mr. Mueller read the following paper on this subject:—"The system of fallowing adopted in Australia has come to stay. It is generally conceded that the object of fallowing is to preserve one year's rainfall by allowing it to penetrate the soil and thus make available two year's supply of moisture for one crop. This is of great importance in a climate where the rainfall is low. Another object, and a probably equally important one, is to permit the air to circulate among the particles of soil in order that the soil bacteria may be able to carry out their functions with reference to the preparation of plant food. Besides these two main objects we cannot lose sight of the effect which fallowing, with the accompanying cultivation, has on keeping the fields clean from weeds. The time when fallowing should be undertaken naturally suggests itself as being most advantageously placed in the autumn, as soon as the state of the soil and work connected with seeding will allow. The water which it is intended to conserve must not be allowed to run off the surface and into the creeks, which most decidedly will occur unless the soil is broken up. It may be argued that certain kinds of soils will set, especially those of a clayey nature, if broken up too early in the season. This can be avoided in two ways, first by cultivating and harrowing it as often as possible at suitable times, or by so changing the physical condition of the soil that even the worst soils in this respect will become friable and loose. This can best be secured by systematic liming and manuring. Even ploughing in the stubble will materially assist in the prevention of 'setting.' As to the work to be done after fallowing is completed, it follows from the foregoing that the cultivator and harrows must be applied with sufficient frequency to keep the surface of the soil worked down fairly fine. This provides the proper mulch which will prevent rapid evaporation and by its porosity take the rain to its deeper parts. The cultivator and harrows should be applied to a depth of from 2in. to 4in., and the work is done most efficiently after a shower of rain. According to Professor Lowrie such treatment of the soil would be responsible for a conservation of water equal to from 2in. to 3in. of rainfall, which would become available when it is most required. Some farmers prefer leaving the fallow in large clods and trusting to atmospheric action to produce a crumbling effect, and also because they are laboring under the erroneous impression that more moisture will penetrate the ground. A little thought should convince them that the latter is impossible if the soil is worked as explained previously. But not only is there no increase in the conservation of moisture but there is a certain amount of loss by the increase of evaporation through the exposure of a larger surface of soil to the evaporating influences of sun and wind. But these objections to leaving fallow in an uncultivated state are comparatively unimportant when we consider the disastrous effect such a system has on bacterial life. The agencies of micro-organisms in the soil are of a greater influence than any manuring or cultivation can produce, and fallowing specially aims at rendering assistance to the bacteria responsible for the nitrification of soils. The reason why the

full effect of their functions has not yet become recognised lies in the fact that we are not yet supplying the suitable conditions under which they can fully develop. These conditions are a full supply of air, moisture, proper temperature, and humus. The oxygen in the air is absolutely necessary to their existence; hence friability of soil must be aimed at, in order that the air may circulate around each particle. Soil bacteria work usefully to a depth of from 3in. to 9in. A temperature exceeding 150° spells disaster to them, except that their spores are not destroyed. As our summer temperature occasionally exceeds this limit on two or more consecutive days, the large clod of soil lying exposed to the sun becomes superheated and all signs of bacterial life disappear. This cannot happen if a fine tilth and mulch, due to the frequent application of the cultivator and harrows, is available. If we examine a clod of soil, or the crumbled parts of such a clod that have been subjected to a summer's heat, it will be found devoid of all organic matter; any root fibres that may have been in it when ploughed up have been destroyed by the heat, and the wind has carried away what was left. There remains then an inert, lifeless mass of mineral matter, powerless to supply the young plant with suitable plant food, powerless to provide the full and favorable conditions for the activity of soil bacteria which are an absolute necessity, and powerless to retain moisture. The deduction from this is that to leave fallow land in large clods is wrong. It need hardly be pointed out that the amount of work to be applied by the cultivator and harrows must vary with the nature of the soil—whether it is stiff and clayey, soft, friable, sandy, and so on. The farmer must use his discretion. For instance, stiff clays will set hard when worked to a fine tilth and neglected by the cultivator and harrows. Green manuring, that is the ploughing in of leguminous plants, such as peas, clover, serradella, vetches, lupines, &c., at the time of coming into bloom has improved fallow land wonderfully, not only in productiveness but also in drought-resisting properties. The seed (preferably inoculated with nitrogen bacteria) must, of course, be put in early to catch the early rains and the warmer atmospheric and soil conditions. When ploughed in, rolling must follow. It also provides early fodder, and depasturing sheep and cattle on it still further improves the soil. As the good effects of green manuring extend over from three to four years, one-third or one-quarter only of the farm need be treated this way each year. It is being tried in several places this season, and will, I am certain, find increased application when some of the more enterprising farmers have demonstrated its advantages. To summarize what has been said, we may now state that fallowing conserves moisture, aids the soil bacteria, admits air and warmth, increases the productiveness of the soil, and makes plant food available. It should be undertaken early, unless green manuring is resorted to. The soil should be worked down to a fine mulch, preferably after a shower of rain, by using the cultivator and harrows. The surface soil must not be allowed to set. Clayey and other stiff soils can be made friable by the addition of lime in a slaked or carbonate form, or by the addition of organic matter in the form of leguminous fodder plants when ploughed in."

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Arthurton, November 3.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Welch (chair), Rowe, Short, Westbrook, Williams, Page, Bull, Collier, Stephenson (Hon. Sec.), and five visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. W. Short. During the afternoon the crops were inspected, special attention being paid to a block of mixed oats and wheat drilled crossways for hay, which looked exceptionally well.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—As this question did not affect the district in any way, the Branch refrained from expressing an opinion on the subject.

Farm Laborers' Blocks.—The general opinion of the members as to the advisability of surveying small blocks for farm laborers in new hundreds was that the whole question bristled with difficulties to such an extent that the scheme was considered impracticable.

WESTERN DISTRICT.

Koppio, December 7.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. F. Richardson (chair), W. R. and R. F. Richardson, G. and M. Howard, Smith, Jericho, Thompson, Brennand, Gardener (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—Due consideration was given to the proposal to substitute the system of selling wheat in bulk for that adopted at present. The Branch decided to support the idea, and suggested that weighbridges should have iron tops, which were more serviceable than wooden tops.

GRADING SEED WHEAT.—This subject was dealt with in a paper by the Chairman as follows:—"Every farmer could increase his yield of wheat very considerably by the careful selection of seed. In the average crop of wheat there are several different varieties mixed with the principal seed, which in the course of a few years entirely loses its type. It is a very difficult matter to keep the seed pure, as there are always a few grains left in the stripper that cannot be got out when required and that get bumped out sooner or later. The same occurs with the winnower, but if one is careful there should be very few grains left. Small and pinched grains are practically useless and should not be sown. A few seasons ago we hand-picked some Marshall's No. 3, as it was getting very mixed and seemed to be going back, and had a number of small bearded heads showing. We picked the largest heads, those that were four and five grains across. The first year this was sown we got about half a bushel. This sown on half an acre of new ground yielded at the rate of 28bush. to the acre. The crop alongside did not yield nearly as heavily, although it was put in under exactly the same conditions and was sown on the same day. Again the best heads of Marshall's No. 3 were hand-selected and sown this year, and we have enough seed from the original hand-picked plot to provide all of Marshall's No. 3 that we require. Some time and trouble are involved in picking, but it pays well, and we intend treating Federation in the same way. With due care there should be no necessity to change the seed, as the Marshall's No. 3 which we have been hand-grading has been grown on the farm for the last nine years, and it is now improving instead of getting any worse. The grader should always be used to clean seed wheat. It is really surprising how much dirt, small grain, and cracked grain there is in a bag of wheat that is apparently a first-class sample. It takes some time to grade the seed properly, but it is time well spent and the grading can be done at any time. Where drake and nancy weed are troublesome the use of the grader is as important as the use of super."

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, December 1.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Venning (chair), Gurner, Talbot, Williams, Fidge (Hon. Sec.), and four visitors.

"THE AGRICULTURAL JOURNAL."—The following paper was read by Mr. Gurner:—"For many years I have been a subscriber to the *Journal of Agriculture*, and have always been a very interested reader. I have noticed its rapid growth, from a small pamphlet to the book of the present time of nearly 400 pages. It has been very useful and helpful to many hundreds of persons who have gone on the land of late years. In the *Journal* there are always some very interesting articles by expert writers on the various phases

of farm work that are well worth careful perusal, and always plenty of suggestions for the farmer and stock-raiser. Then we have the results of the farming methods of the Roseworthy College Farm, and although a lot of money is spent there, it is necessary that there should be some experiments that will benefit the community generally, and which should save the individual farmers time and money and ascertain for him the most profitable means of utilising his land. It was the results of experiments at Roseworthy that brought about such an extensive use of super. and other manures that have done so much to benefit the farming community and increase the returns of wheat and other cereals throughout the State. Then we have the reports of the Agricultural Bureaus, which are of the very greatest interest, embracing such a variety of subjects, giving such a deal of information on all the various phases of farm life, and the opinions of men of great experience, offering suggestions for experiments, and at times giving valuable information on the treatment of stock, &c. I feel sorry to say that I have always looked in vain for any reports of papers on subjects from our own Coonapyn members, whom I feel sure are equally capable of giving the results of their experience as others. We read some splendid papers given by members of other Branches, but none from our own. What are the reasons for this? It is the fault of the members themselves. If the papers were handed over to the Secretary he could forward them on for publication. This is one matter that it would be well to look into, and if, in the future, it is carried out, then this paper will not have been written in vain. Papers written by members of the Coonapyn Branch should be helpful to others, more particularly those farming in the mallee country. I like the style of advertisements in the *Journal*. They are useful and very suggestive as to the requirements of the farmer, and I should like to see an increase in this direction. I feel sure that the business people would do well to make more use of the *Journal* for advertising purposes, and it would help somewhat in this direction if farmers, when ordering, would mention that they saw the advertisement in the *Agricultural Journal*. We should do all we can to make the *Journal* as attractive and useful as possible, and with that end in view make any suggestions that occur to us. We might lend our *Journal* to others to read, or post it on to friends, or, as the subscription is small, only 1s. per year, have it sent on to some friend. I have sent several, and also induced them to take it themselves, often collecting the money and paying it in for them. One page or half page used as a good plain, large figured almanac would be useful, for we would certainly always have one at hand, for we all have the *Journal*. I should like all the Government advertisements relating to the sale of town lots of land or country lands open for selection put in the *Journal*, for it would keep the farmers as well as the city folk advised of what was going on; for the advertisements always appear in the daily papers, but not in the weekly papers. It is the latter that the farmers take generally, and they seldom see a daily paper, and so they often miss notices of land for sale by public auction and personal application. There are also other Government advertisements, such as pound notices, noxious weeds, scrub fires, close season for game, and many others of like nature, that could well find a place in the *Journal*." In discussing the paper members generally agreed with the views expressed by Mr. Gurner. It was thought that the inclusion of more advertisements would be an improvement.

Monarto South. October 3.

PRESENT.—Messrs. Braendler (chair), G. and H. Patterson, Anders, Harper, R. Hartmann, Altmann, Tilbrook, Thiele, J. and E. Frahn, Hoff, and one visitor.

WHEATS FOR HAY AND GRAIN.—Mr. G. Patterson contributed a paper, in which he said he had tried a number of varieties of wheat during a period extending over many years, and he had secured the heaviest crop from Pride of Barossa. Purple Straw, Yandilla King, and Dart's Imperial had yielded well also. This season he had about 12 acres of Golden Drop which was doing well. It was an early variety, and he always favored the early wheats as they grew much quicker in the winter, and there was consequently a fair length of straw, even although the weather was dry in the spring. For grain, he had secured the best results from Federation, Yandilla King, Gamma, Purple Straw, Budd's Rustproof, and Marshall's No. 3. This year Federation was not looking so well as usual, and so far he had not been very successful with Dart's Imperial. It was always advisable to sow a good proportion of rust-resisting varieties, as the crops were always liable to an attack from red rust. Mr. Braendler, in a paper dealing with the same subject, said the best wheat for hay in a wet season was White Tuscan, as it grew thickly and to a good length,

possessed plenty of flag, and was soft and sweet. Its only drawback was the fact that it was a late variety. When sowing for hay in a dry season he recommended the following mixture:—Two parts Pride of Barossa, one part Dart's Imperial, and one part Purple Straw to be mixed when being pickled. This yielded a good hay. One variety provided good grain whilst the other two were green, and excellent chaff of good color and holding plenty of grain resulted. He sowed about $1\frac{1}{2}$ bush. to the acre. He had tried oats and wheat mixed, but did not like it, as when it was left in the stack the mice did much more damage than with wheat only. In the discussion which followed, Mr. Patterson said he had found it a good plan to sow both early and late wheats for hay. If a dry spell occurred during the spring the early variety had usually made sufficient growth to ensure a return. If the spring weather was favorable the late variety made better hay. Mr. Altmann favored Yandilla King, both for hay and grain.

Morgan, December 2.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. R. Wohling (chair), Pope, Hempel, Hausler, French, and H. Wohling (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—A lengthy and profitable discussion took place on this subject. Members expressed themselves as being in favor of the project, but in this district the majority of farmers had landings on the bank of the river, over which they sold their wheat. The country was very sandy, and consequently it was not practicable to cart the wheat to a common centre for weighing.

Parrakie, November 25.

PRESENT.—Messrs. Dayman (chair), Lewis, Schmidt, Brinkly, Threadgold, Beelitz, Temby, Randall, Hammond, Gravestocks, A. and O. Heinzel, Hameister, Diener (Hon. Sec.), and three visitors.

MALLEE SHOOTS.—In reply to a question from Mr. Hameister, as to the best time to cut mallee shoots, Mr. Randall said as soon as possible after seeding gave the best results. Mr. Gravestocks thought March the best time. He would use the fire rake as much as possible, in order to obviate cutting. Mr. Schmidt thought it a mistake to fallow land, and let the shoots grow. He preferred to cut, rake, and burn them. He secured a nice crop from land which he had treated in this way. Messrs. Lewis and O. Heinzel recommended cutting as early as possible, and would clear off the shoots if time permitted. Mr. Beelitz, however, would cut after fallowing and before harvest, as large shoots took a considerable quantity of moisture from the ground. Mr. Threadgold would cut the shoots and rake them up with the stumps on the fallow. He would then burn the shoots and the stumps. Mr. Hammond thought that by allowing the shoots to lie on the wheat, the young plants would be sheltered. Mr. Brinkly said no good was done the ground by allowing the shoots to lie on it. The Chairman had had shoots cut and had also fallowed land with the shoots on it. Allowing the shoots to lie did no harm, but if they were raked up and burnt good was done by the fire. The majority of members favored cutting as early as possible, and burning when time permitted.

MOST PROFITABLE WHEAT.—In reply to the Hon. Secretary's question as to the experience of members regarding the growth of the different varieties of wheat during the present season, Mr. O. Heinzel pointed out that King's Early looked a good deal better than the other wheats so far as his crop was concerned; Marshall's No. 3 was the best Mr. Lewis had, and on Mr. Schmidt's farm Early Bluey and King's Early were the most promising. Mr. Gravestocks was most successful with Gluyas Early, whilst Early Pearl was the best Mr. Hammond had. Mr. Brinkly's best was Budd's Early and Carmichael Eclipse; Mr. Randall's, King's Early; Mr. Threadgold's, King's Early, Golden Drop, and Walker's Wonder; and Mr. Temby's, Baroota Wonder, Richter's Eminence, and Budd's Early. The

Chairman was most successful with King's Early, Yandilla King, and Federation in the order named. The Hon. Secretary had a nice crop of Budd's Early, and Golden Drop was also doing well.

SUPER.—A discussion took place regarding the most profitable super. to use. The majority of the members had used both high and low grades, and had found that the crop was just as good with the low as with the high grade of super. Mr. Gravestocks preferred Guano; and Messrs. Beelitz and Schmidt intended in future to use low-grade supers.

FIELD TRIAL.—It was decided to hold a field trial of cultivating implements on February 9th, 1912.

Wilkawatt, December 2.

PRESENT.—Messrs. J. Ivett (chair), W. J., D. F., and D. Bowman, Harvey, T. Sorrell, sen., Ahrens, Alters, C. Sorrell, Schulze, T. Sorrell, A. V. Ivett, McAvaney, Speckman, Brooker, and two visitors.

HAY-GROWING.—This subject was dealt with in a paper by D. F. Bowman, in which he said that it was essential that settlers in newly opened country should grow hay. As soon as his harvesting was over the farmer should prepare at least 40 or 50 acres for growing this fodder. A good piece of land was necessary, and this could be sown half with oats and half with wheat about the end of April. Algerian oats were good for hay, and suitable wheats were Gluyas, White Tuscan, Le Huguenot, and Smart's Early. On account of its liability to red rust, Bluey Early should not be sown.

THE SEASON AND METHODS OF WORKING.—Mr. H. H. Brooker contributed a short paper descriptive of the various outstanding features of the present season, and their relative suggested variations in the principles of cultivation. When the season was dry the ground should be ploughed well and the wheat drilled early. Late wheats were a failure on new ground. Land intended for the growing of hay crops could be rolled with advantage. Members expressed the view that farmers should not always depend on good flat ground for their hay, but should sow wheat on sand as well.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, December 5.

(Average annual rainfall, 35.3in.)

PRESENT.—Messrs. Chapman (chair), Broadbent, C. and J. Lewis, Mildwater, Ricks, T. A., and H. Jacobs, Tozer, Stone, H. Lewis, Brumby, and Curnow (Hon. Sec.).

ANNUAL MEETING.—The Hon. Secretary in presenting his annual report said 11 meetings had been held during the year, with an average attendance of 11 members. The following subjects had been dealt with:—"Farm Labor Supply," "Wood-cutting," "Apple Root Borer," "Espaliers," "Root-pruning," "Foundation Comb," "Educating Horses," and "The Journal of Agriculture." One meeting was devoted to entomological studies, and one to a question box. Continuing, he said—"We have maintained our interest in arboriculture. During October the Hills Conference was held under the auspices of this Branch, and passed off successfully. We feel that our work has had some little influence outside of our own radius, and whatever we have done we have given of our best. Our meetings have been devoid of acrimony and ill feeling, and, although at times we have differed in opinion, we have ever remained the best of friends and good comrades."

Forest Range, November 30.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. J. Green (chair), Rowley, Schultz, Pollard, E. Green, and Monks (Hon. Sec.).

SIDE LINES FOR GARDENERS.—Mr. F. Rowley read the following paper on this subject :—“With the prices for garden produce so liable to great fluctuations, it is well for the gardener to have some side lines to assist in providing the income. Very often when there is a good crop of any particular produce the gardeners have to accept prices that do not even pay the cost of cartage to market. The question arises, What is to be done with it? Is a small proportion to be sold and the balance allowed to rot on the ground, as is very often the case? If we marketed the portion which we could sell at a reasonable price and fed the remainder of the crop to pigs it would pay far better. Therefore I advocate pig-farming and poultry-raising as side lines for gardeners. Although these may be more suitable for farmers, the gardeners might do very well by keeping a number of pigs or poultry. When pigs are kept it is advisable to put 1 ft. wire netting round a portion of the garden, and also two or three barb wires, one just above the ground, to prevent the pigs from rooting up the netting. This portion could be sown with field peas; say, every second year, and the pigs could be turned in when the peas were dry. Root crops, such as mangels and turnips, could be grown. Boiled and mixed with a little pollard they make excellent food. With all small potatoes and vegetables which were not up to the mark, codlin moth apples, pears, inferior fruit, a fair number of pigs might be kept and could be made to pay handsomely. I have proved poultry to pay very well, and this industry can be made to work in well with gardening.” In discussing the paper, Mr. Schultz said the average gardener could profitably raise more pigs than he did at present, but poultry were a nuisance. If food had to be purchased for them it would not pay to keep them. Mr. E. Green thought pigs and poultry could be made to pay by the gardener if they received proper attention. Mr. Pollard considered gardeners took too much inferior produce to market, and better results would accrue from the practice of feeding poor fruit and vegetables to pigs and poultry. Mr. Monks thought it necessary to keep these animals on large holdings, where it was also possible to keep cows, but they would not pay on small holdings. Mr. J. Green did not consider apples a suitable food for pigs unless they were mixed with pollard. Peas grown in an orchard for pigs were not a success. These side lines could be profitably engaged in until the orchard came into bearing, when it was better to discard them.

Kanmantoo, December 2.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. W. Downing (chair), J. and B. Downing, H., E., and W. Shepherd, Critchley, Pymn, Talbot, Powell, J. and A. Mills, W. Mills (Hon. Sec.), and one visitor.

FARM GATES.—In a paper dealing with this subject the Hon. Secretary said that it was advisable for the farmer to have well-swung gates, and where the gates were in regular use, he recommended the purchase of one of the various lines on the market. When it was necessary to put in a gate where it would be seldom be used, a secure, yet cheap, gate could be made on the farm out of 3in. x 1in. stringybark. The rails should be sufficiently close to make a gate sheep-proof, and it was necessary that a piece of timber should be bolted from corner to corner of the frame to prevent it sagging. The cost of such a gate should not be above 7s., and with a coat of tar it should last for a considerable time. A very good light gate could be made from four tee-iron fencing posts. The ends of the top and bottom bars should be turned at right angles in order that the heads could be riveted on. The heads should project for 4in. or 5in., and a barbed wire should be stretched across the top. A piece of wood set at the foot of the strainer could be used for the purpose of holding the gate head. The material for this gate should not cost above 3s. All gates through which stock were to be driven should be able to swing in either direction. When hanging a gate it was always necessary to use a plumbob in order to get it upright. Mr. H. Shepherd read the following paper also on this subject :—“Tidy, useful gates, greatly improved the value of the farm. Almost every day we notice gateways with two or three heavy sticks and several pieces of wire dragging on the ground, in place of which a neat and serviceable gate could be had for the cost of a few shillings if they obtained a few pieces of timber and put them together properly. The best home-made gate for the farmer is one made from either oregon or stringybark. I prefer oregon, as it is much easier

to work and is far lighter, and when painted seems to stand the weather better than the stringybark, which wood seems inclined to crack and warp and is more likely to be eaten by white ants. A gate of 3in. x 2in. oregon with four panels and a strut is very suitable for farm use; it can be improved and strengthened by addition of a couple of $\frac{1}{2}$ in. iron bars. The hanging of the gate seems to be the greatest trouble with the amateur gate-maker, as it takes some practice to enable one to hang it to run true. Never fasten a gate to a post which has wire strained to it, as the post is bound to give and thus throw the bolt or peg out of its fastening. Rather put a piece of sawn timber or a post between the gate-head and the strainer. If you have wood or iron gates never omit to give them a coat of paint once a year. In addition to improving the look of them the amount spent in paint and time will be repaid in the extra time the gate will last. For ordinary farm use use oregon gates, but around a homestead I prefer the look of the ornamental iron gates." Considerable discussion followed the reading of the papers. Mr. J. Downing did not favor the idea of putting barbed wire on top of gates. Mr. E. Shepherd thought single gates were more suitable than double gates. He did not consider it wise to hang gates in such a manner that they would close automatically, as it was then necessary that they should be fastened open when a conveyance was driven through. The Hon. Secretary said that where a gate was fastened open there was no danger of its being blown shut when a vehicle was being driven through.

Longwood, December 2.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes, Pritchard, Oinn, Roebuck, Nicholls, Blakley, Doley, Glyde, and Coles (Hon. Sec.).

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. E. W. Pritchard. The orchard was inspected, and during the inspection Mr. Pritchard explained that he was using both paste and powder in arsenic of lead compounds for spraying, and apparently the powder was adhering to the trees somewhat better than the paste. He had used a spray made from Bordeaux powder on plums for shothole fungus, and on apples for *Fusicladium*, and the result could be noticed by comparing those trees that had been sprayed with those that had been left in order to accurately ascertain the effect of the spray.

Lyndoch, December 7.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), H. and E. Springbett, Klaube, Kennedy, Schrader, Warren, and Hammatt (Hon. Sec.).

TURPENTINE FOR FLY-BLOW IN STOCK.—Mr. Warren stated that the foreleg of one of his horses had been very badly injured through getting entangled in a wire fence. The animal, when found, was in a very bad state, with a wound 10in. or 11in. deep seething with maggots. After several ineffectual attempts to dislodge the maggots, turpentine and oil were forced into the wound with a syringe. This had the desired effect. The wound was then bathed twice a day in a weak solution of diluted lysol, and dressed after washing with boracic acid and iodoform. New tissues were rapidly forming, and the animal was doing splendidly.

MacGillivray, December 4.

PRESENT.—Messrs. Wheston (chair), Ayris, Petras, Stirling, sen., Wiadrowski, Williams (Hon. Sec.), and one visitor.

HARVESTING CEREALS.—This subject was dealt with in a paper by Mr. A. Stirling, sen., in which he said that it was necessary in the case of barley to get rid of thin or light grain when harvesting, and this could be best done by using the stripper and treading the grains out with horses. He had also used the motor winnower with fair success. Oats were best dealt with by the stripper and winnower, but he did not favor the practice of covering

the screen with a bag. As a general rule farmers got on to their wheat harvesting too early. He would not use the harvester, as it was very desirable that the cocky chaff should be saved, and wheat harvested in that way was more likely to be weevilly, as it very frequently contained green grains, which did not get the chance of ripening in the heap as did grain that was to be put through the winnower. When grain was being stored for seed it was essential that the bags should be plainly marked, and that it was so placed that the variety required for early sowing could be reached without difficulty. Members generally agreed with the views expressed in the paper. Mr. Petras thought there was danger in feeding barley chaff to horses, but other members had noticed no ill effects therefrom. Binding and threshing was the usual means adopted by local growers for harvesting barley.

Meningie, December 9.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Hiscock (chair), Williams, Taylor, Hill, Mincham, Ayres, Pettit, and Tregilgas (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—Careful consideration was given to the proposal to substitute the system of weighing wheat in bulk for that at present in vogue, the outcome of which was that the Branch decided to support the idea.

Morphet Vale, December 19.

(Average annual rainfall, 22½in.)

PRESENT.—Messrs. A. C. Pocock (chair), T. and A. Anderson, Perry, Sprigg, Christie, Connole, Higgins, Rosenburg, and Hunt (Hon. Sec.).

MOUTHING COLTS.—Mr. Higgins initiated a discussion on this subject. Mr. Pocock had tried a rein attached to the bit running through a ring on top of a surcingle. This was better than the practice of tying the head to the sides by means of a rein, the chief objection to which was the difficulty of tying the reins so that they were equal in length.

SOUTH-EAST DISTRICT.

Kalangadoo, November 11.

PRESENT.—Messrs. Riddock, Crouch, Mitchell, Kennedy, Bennett, Boyce, Guerin, Hemmings, McCorquindale, Earle, Rake, Osborne, S. and D. W. Tucker, Sudholz (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—The meeting was held at the residence of Messrs. S. Tucker and sons. Considerable interest was evinced in an oil engine and chaffcutter, which had been recently installed. The sheep and lambs were inspected, and general surprise was expressed at the quality of the latter, which were forward and fit for freezers. Mr. Tucker said the most profitable sheep for the farmer, was the progeny of a Merino ram on a crossbred ewe. A crop of Algerian oats looked well, and was estimated to yield from 45bush. to 50bush. to the acre. Mr. Tucker, however, intended cutting it for hay. Comeback wheat, on ground which had last year carried a crop of peas, presented an exceedingly heavy appearance, clearly showing the benefit of rotation. The host and hostess kindly provided afternoon tea.

Kybybolite, November 9.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), Colebatch, Duffield, Pettit, Schinckel, Scott, C. and G. H. Hahn, Anderson, Lacey, Rumball, Alcock, A. R. Scholz, C. H. Scholz (Hon. Sec.), and four visitors.

QUESTIONS FROM CONGRESS FOR OPINION.

Selling Cattle by Live Weight.—Due consideration was given to the proposal to introduce the system of selling cattle by live weight, and as an outcome the Branch decided to afford the idea its support.

Farm Laborers' Blocks.—It was thought that the proposal to survey small holdings for farm laborers in new hundreds would have a beneficial effect; and members agreed to support it.

MANURES AND MANURING.—Mr. Alcock initiated a discussion on this subject. He considered it advisable to apply a dressing of at least 2cwt. of super. per acre, as that quantity would leave the soil in better condition for growing the following crop, or for grass, than if a quantity only sufficient to secure a crop the year of application was given. Phosphates did not lose their strength, but remained in the soil in a soluble form until taken out by plant life, and so any quantity not assimilated by the crop left the soil in a better condition for succeeding seasons.

Millicent, November 21.

(Average annual rainfall, 28½in.)

PRESENT.—Messrs. Mutton (chair), Holzgreffe, Mullins, Serle, Hart, Bowering, Stuckey, and Day (Hon. Sec.).

HOMESTEAD MEETING.—The meeting was held at "Blue Gum Park," the homestead of Mr. H. F. L. Holzgreffe. The woolshed was inspected, and Mr. Holzgreffe displayed a sample of the clip, which was nicely got up into three distinct classes, viz., fine, medium, and coarse. The sheep, of which there were 4,000 sheared this season, were three-quarter bred Merinos. They grew a nice length of fine saleable wool, and developed a frame that made their fattened value considerable. The flower garden presented a well-kept appearance, and members were much interested in the lighting plant. Twenty lights were supplied with gas generated by a non-explosive gas engine, and the stables and other outbuildings were illuminated with a fine clear light. The wheat crop, being part Tuscan and part Federation, was found to be far above the average for the district, although there were traces of smut around the outer strips. Mr. Holzgreffe explained that when sowing he ran out of pickled seed when he had yet a strip or two to sow. Unpickled wheat was put in, which accounted for the presence of the smut.

QUESTIONS FROM CONGRESS FOR OPINION.

Weighting Wheat in Bulk.—This subject was duly discussed. Mr. Stuckey pointed out the cost of installing the weighbridges, and suggested that the better course was to keep to the present system. Mr. Hart believed the proposed system would be all right, provided the bridges were reliable. He had noticed differences of several hundredweight in checking the machine at the Millicent Railway Station. Mr. Mullins said the Northern farmers were much dissatisfied with the present system. There was a considerable risk of mistakes in weighing out large quantities a bag at a time. The Branch decided to give the proposal its support.

PEAS AND BEANS.—The Chairman tabled a sample of green pea straw of remarkable growth. It was over 5ft. long, and had trailed up a fruit tree, and had borne a good growth of pods. It showed that vegetables could be successfully grown close to fruit trees. Mr. Mutton exhibited a broad bean stalk 7ft. high. He advised vegetable-growers not to nip the buds off their plants. The plan was all right if it was desired to force the crop, but not otherwise. This bean might be profitably grown as fodder for stock. Messrs. Stuckey and Hart both stated that they had tried to grow them on the Wyrrie, but without success. They wanted heavy soil and should be manured.

PRUNING TOMATOES.—Mr. Mutton said he did not believe in pruning tomatoes. He had not pruned his, and they were as good as any he had seen grown in the district.

SUGAR BEET.—A discussion on this subject was initiated by Mr. Holzgreffe, who related the history of an early movement in the direction of beet culture at Mount Gambier. The difficulty then experienced was to get a payable price for the beet. In the beet-growing centres of the older countries factories were very numerous. He thought beet

could be grown in Millicent in payable quantities. Mr. Hart thought Millicent was too near the seacoast for growing beet, and suggested Glencoe as being a more suitable locality. Mr. Bowering said a fair average quality beet would realise 15s. per ton. Not many people would grow it at that price. Mr. Mutton suggested that half a ton might be grown and sent to a factory in order to ascertain the amount of sugar it contained.

Mount Gambier, December 9.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Wedd (chair), Dow, Pritchard, Holloway, Engelbrecht, Keegan, Kennedy, Sassanowsky, Schlegel, Botterill, Watson, Ellis, Buck, and Collins (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—The proposal to substitute the system of selling cattle by live weight was discussed at length. Mr. Ellis considered the scheme, which was the system in practice in England, an innovation that would be of great advantage to the producer. If cattle were weighed as they entered the selling yard, and their weights were registered, buyers, by judging the quality, could get very near the correct weight of beef. If the system was adopted it could be introduced at the new selling yards in Adelaide. He did not think it could be carried out in the country, as it would be necessary to have great method and preciseness. Mr. J. Botterill thought that in the past those who fattened cattle had been much misled by Adelaide quotations. They would see beef quoted at 24s. or 26s. per 100lbs. This was not the estimate of the auctioneer, but rather of the butcher who bought the beef. Under the proposed system sellers would be able to compare the cattle they had left with those they had sold, and would be able to arrive at a very close estimate of their value. Mr. A. A. Sassanowsky said that as 90 per cent. of the cattle were sold singly in the Adelaide market, it would be easy to arrange at the new saleyards for weighing each beast as it entered. He was sure it would be an advantage to those who fattened cattle to know that they were being paid for every pound of fat they put on their beasts. In America every beast was sold by live weight. The Branch decided to give the proposal its support.

FAT LAMB INDUSTRY.—Mr. J. Botterill gave an interesting and instructive address on the fat lamb industry. He pointed out that during the past few seasons wool had been realising better prices, and people had gone in for wool and discarded the Shropshire, which bred mutton sheep. Lamb buyers all agreed that this was a mistake. Lambs to-day were not nearly so good as they were six or seven years ago. This year between 2,000 and 4,000 less lambs would be sent away from this district than last year. Each year of late the total output of fat lambs was becoming less, and this was a serious matter. New Zealand had been the first to go in for the industry, and there it had made great strides. But they could produce lambs in this district equal to those grown anywhere. There were a few essentials which should be observed in raising fat lambs. They must pay attention to good feeding, and remember that it was just as easy and cheap to feed well-bred lambs as it was to feed inferior lambs, and they would cost no more to look after. It was absolutely necessary to have an even lot of ewes. If the flock of ewes was uneven, then uneven lambs must necessarily follow. A buyer could easily arrive at an estimate of the weight of an even lot of lambs. With an uneven lot, however, he had to make allowances for smaller lambs, and naturally it was much more difficult for him to arrive at a correct estimate of the average weight. The buyers were good judges, but in an uneven lot it was only natural that the producer should be the loser: the buyer had to make allowances to protect himself. If the ewes were kept in good condition it should be possible to mark 90 per cent. to 95 per cent. of lambs, and of these to sell 90 per cent. to 95 per cent. This would leave very few on hand. If they bred fat lambs for profit they must sell 90 per cent. to 95 per cent. It was useless to keep lambs intended for fats for wool. If Lincoln rams were used they were breeding for wool. With Shropshire rams and an even lot of ewes, the lambs would be very even, and 90 per cent. to 95 per cent. could be sold. Lambs could not be fattened in two or three months. Some growers worked on the idea that lambs could be reared on poor country, and they then put them on rich pasture and tried to rush them on. This was a fallacy. On 600 acres of inferior or second-class land he had this season 600 ewes. From these he had 590 lambs, and sold 580 as fats. This left him with only 10 on hand. The cash return from the lambs was at the rate of 11s. per acre. They were little trouble and very

easily managed. It was necessary to first breed well, and then feed well. They should not be afraid to pay £2 2s. or £3 3s. for a good ram. Mr. Gunn (Messrs. Borthwick and Sor's buyer) had said that he had never found anything to beat the Shropshire ram. The ewes bred better and heavier lambs. They did not mature as early, perhaps, as those from Dorset Horn rams, but they were of more even type, and weighed particularly well. A number of producers thought that if they could possibly carry, say, 200 sheep they should do so, but they must not, if they wished to rear fat lambs, attempt to carry 200 where there was only room for 100. In the western district of Victoria they had splendid pasture, but while they could fatten sheep and cattle they did not do so well with lambs, and they could not compete with this district. For a time they went off Shropshire rams, but he noticed that they were coming in again, and Shropshire rams in Melbourne recently brought £4 4s. where a year back they would have brought only £2 2s. The fat lamb industry was worth great consideration. It was certain that in a short time they would see some of the countries on the Continent opened up for the frozen meat trade. It was an industry to which all might give consideration, and one that would bring in a considerable return with little trouble. They must, however, remember that uniformity was the great rule. Anything from half to three-quarter Lincoln ewes would do, but to have an even type was more essential than to breed all true to the Lincoln type. The Chairman said he noticed all the frozen lamb experts recommended Shropshire rams. The lambs would fetch $\frac{1}{4}$ d. per pound more. The Lincoln-Merino cross were too long-legged. Mr. A. A. Sassanowsky said he agreed with Mr. Botterill in his remarks on breeding. They wanted an even line of ewes. There certainly was money in fat lambs, but he thought mixed wool-growing would pay as well. Mr. H. Kennedy said fat lamb-raising did not pay. Three years ago he got 9s. 6d. for his lambs off shears, but that was for 60 per cent. of them. The following year it was not so good. Last year he got more for his crossbred weaners—the rejects—a few months later than he got for his fat lambs at Christmas. Unless they could get 2s. more for their fat lambs he did not think they would pay on second-rate land. It would be better to keep more store sheep. Fat lamb-raising, he thought, required rich land.

Naracoorte, November 11.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. L. Wright (chair), Williams, Coe, Rogers, Caldwell, Loller, Wray, Bray, and Langeludecke, jun.

HAYMAKING.—An address on this subject was delivered by Mr. Loller, who tabled a number of samples of oats and wheats which he intended cutting for hay, including Indian Runner wheat and Algerian oats mixed, and Huguenot wheat mixed with Algerian oats, which varieties mixed he strongly recommended for hay. Dart's Imperial was also a good hay wheat. He had heard it said that it was not worth while fallowing in the South-East, but he had proved otherwise, and showed specimens of crops grown on fallowed land and on land which was not fallowed, and they demonstrated that the crop on the fallow was much better in every way. Haymaking was one of the most important operations connected with farming, as it concerned the preserving of food for the sustenance of their stock throughout the year. The primary question in making hay was how to cut and preserve it so as to conserve the most nutriment. The first operation was the cutting of the crop, and it was most important to know the best condition in which to cut it. He believed generally in cutting it green, just when it was shedding the bloom. The most nourishment was required in the straw, and if the crop was allowed to ripen too much the nourishment went into the heads. It was better for stock that the nourishment should be distributed throughout the plant. When the crop was cut immediately after the bloom was shed they obtained a good solid straw or stalk, possessing plenty of nourishment. He had tested hay both when cut green and dry, and he found horses did better on the hay cut green. He had used Medeah wheat for hay, and found invariably that it made the best hay when cut just after the bloom was shed. Horses did not do well with hay cut dry, especially if it was from wheat, as it had a lot of grain. Tuscan was another favorite wheat which they should cut when green. He believed in cutting oats in a more ripe stage. If they were cut when too green the hay became sour. In a mixed crop they should choose a late wheat, and he had found that Algerian oats and Huguenot wheat did well together. Sometimes the oats choked the wheat, and to avoid this they should sow in the proportion of one-third of oats to two-thirds of wheat, and not half

and half. There were many circumstances which led them to alter hard and fast rules, and it was so in cutting a crop for hay. Experience, therefore, should weigh with them as to the best time to cut a crop for hay. He believed in close mowing. The closer they mowed the better the hay cut. The binding depended upon the state of their crop. They should keep their twine fairly well down, and tie as tightly as possible. This made the sheaves better to handle, and it meant a saving in labor. He believed in keeping the sheaves in a straight line, because this also meant a saving in labor. The stooking was a very important part of haymaking. Sheaves should be stooked in a slanting position so that rain would run off them readily. Never leave an opening in the stooks. As to how long the hay should be left without stooking depended on the weather. As a rule in ordinary weather it should be left for 24 hours before stooking, but wet, cloudy, or very cool weather were factors to be considered. The riper the hay the quicker it must be stooked. He advised carting into the stack as early as possible; and the greener the hay the more need there was for caution in stacking. A lengthy discussion followed Mr. Loller's address. Mr. Coe said last year the greater part of the hay he had seen in the North was stooked with the sheaves lying flat on the ground. He thought hay was more likely to be damaged by rain lodging in the flags if it was stood upright. Mr. Bray believed in upright stooking. Mr. Loller explained that the hay held more moisture and consequently weighed heavier when it was stooked flat on the ground, but the quality deteriorated. With a very dry summer horizontal stooking might be found satisfactory, but it would be a failure in the South-East. He considered covering stacks with iron was most economical. Iron would last for 20 years for this purpose if handled carefully.



Charlton Apiary, Eyre Peninsula.

AGRICULTURAL PUBLICATIONS.

The following publications have been issued by the Department, and are available for distribution at prices mentioned:—

“Vinegrowers’ Manual,” by A. Sutherland, 6d.; posted, 7d.

Reports of Conferences of Australasian Fruitgrowers held at Brisbane and Wellington, 1s. each; posted, 1s. 1d.

Journal of the Department of Agriculture of South Australia, 1s. per annum in advance to those resident in South Australia; 3d. per copy; and 2s. 6d. per annum in advance to those outside the State.

Any of the following Bulletins and Leaflets may be obtained by sending a penny stamp for postage:—

Agricultural, Miscellaneous: Reports of Agricultural Experiments; Bunt Tests; Roseworthy College Harvest Reports; Amount of Spirits to be Extracted from a Ton of Raisins; Lucerne Hay; Reports on Agricultural Bureau Congress; Irish Potato Blight; House-building in New Districts; Reports on Permanent Experiment Field; Reports on Roseworthy Farm Flocks; Noxious Weeds; Milling Characteristics of Australian Wheats; Milling Qualities of South Australian Wheats; Lucerne Cultivation; Trial of Stone-Gathering Machines; Hints for Intending Irrigationists; Two Blue Weeds; Inquiry into South-Eastern Conditions; Milling Experiments.

Horticulture: Bordeaux Mixture and other Fungicides; Fruit-preserving for Domestic Supplies; Fruit-drying in California; The Codlin Moth; Fruit-drying for Beginners; Fruit Flies; Fruit Maggot-fly Pests; Cider-making; Defects in Export Apples; The Apple Mussel Scale; Select List of Fruit Trees; Preserving, Canning, and Drying Fruits; Plums and Prunes; The Lemon in Sicily; Some Notes on Almonds; Gumming Disease of Peach and Almond Trees; Curculio Beetle; Production of Early Tomatoes; Fertilization of Orchard Lands; Spraying against Codlin Moth; Popular Remedies for Common Diseases in Fruit Trees.

Stock: Stomach and Bowel Disorders of the Horse; The Botfly; Branding of Stock; Worms in Horses.

Dairying: Taints and Flavors in Dairy Produce; List of Dairy Factories; Spaying of Cows; Milking of Cows.

Poultry: Reports of Egg-laying Competitions; Single Testing for Egg Production

“The Poultry Manual” can be obtained by sending 7d. to the Government Printer, Adelaide.

The Journal of Agriculture each month contains items of interest in regard to poultry-raising.

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Agricultural High Schools.

Acting on the advice of the Director of Agriculture (Professor Lowrie) the Government has decided to establish two agricultural high schools under the Education Department—one at North Bundaleer and the other on the Moorak homestead. It is intended that the new schools shall serve the purpose of preparatory schools for students desirous of entering Roseworthy College, that they shall be utilised for the training of the teachers of the primary schools, especially those located in country districts, in agricultural subjects, and that winter classes for farmers shall be formed in connection with them. Speaking in reference to the new departure the Minister of Agriculture (Hon. J. P. Wilson) said that he was of opinion that the State had not been doing enough in connection with the higher training of boys and girls in the science and practice of agriculture. It was desired that boys should be able to advance from the primary schools to the proposed high schools, thence to Roseworthy College, and finally to take their B.Sc. degree at the University. The Minister added that he hoped eventually to see Roseworthy College become the agricultural university of the State, and that he believed instruction at the agricultural high schools should be free.

Prices of Wheat.

According to *Beerbohm* the prices for wheat in the middle of December for the past seven years were—

	1911.	1910.	1909.	1908.	1907.	1906.	1905.
English wheat	32/9	30/7	33/2	32/9	34/8	26/1	28/5
No. 2 Manitoba afloat	37/9	34/6	39/-	37/9	41/-	30/3	32/3
Australian, new crop..	35/9	36/-	39/-	36/-	39/-	30/-	32/-
62lb. Rosafe, new crop	35/3	34/-	35/6	35/6	37/-	29/-	31/-

Berseem.

In another part of this issue a short article by Professor Perkins appears concerning the cultivation of Berseem, or Egyptian clover (*Trifolium Alexandrinum*). A shipment of 3 tons has now come to hand, and the Department of Agriculture, Adelaide, is booking orders for a limited quantity at 6d. per pound, Adelaide.

The Land Board.

Mr. E. Britten Jones (Government Valuator and a member of the Land Board) has been appointed Chairman of the Land Board in the place of Mr. T. D. Porter, who, owing to an injury to one of his legs received some time ago when he was at Marmon Jabuk, has applied for and been granted 12 months' leave of absence. To fill the vacancy on the board caused by the appointment of Mr. Jones as chairman, Mr. William Pethick, who entered the service in 1876, and who since March, 1911, has occupied the position of senior surveyor, has been appointed a member. The two appointments took effect on February 5th. It is probable that when Mr. Porter's leave begins, on March 1st, Mr. Jones will also be appointed Acting Deputy Surveyor-General.

Profitable and Unprofitable Dairy Farming.

Some interesting figures, showing the difference in the money value obtained by farmers in the State of New York from their dairy herds, have been published by the New York Experimental Station. In one case a farmer derived an income of £180 from eight cows in the year. In the same district (the same year) another farmer keeping 22 cows received £178. He had done all the work of caring for and feeding 14 more cows to get about the same income. In another locality some of the farmers secured an average of 300lbs. of butter fat per cow, and others in the same time went as low as 80lbs. "The only conclusion from the data secured," says the author of the article, "is that a few farmers in every neighborhood have solved the question of profitable dairying by breeding and properly caring for good cows, while large numbers are paying no attention to any of these details and are blaming their lack of success to prices."

The Soja Bean as a Source of Rubber.

The high price of rubber during the year 1910 has had, says the *India Rubber World*, a stimulative effect that should not be overlooked on the activity of those inventors who devote their attention to the production of synthetic rubber, rubber substitutes, and the perfection of the various processes for the reclamation or other means of using old rubber. Even the Soja bean, a staple article of food supply in the Far East, and the residue of which, after extraction of the oil in the form of béancake is, with the bean itself, imported into Europe for use as cattle feed, has been laid under contribution by the indefatigable searchers for a raw material for artificial rubber, a German patent having been issued for the manufacture of artificial rubber from soja bean oil.

The Grain Trade.

The Victorian Select Committee, which last year inquired into matters affecting the grain trade, and during the sittings of Parliament presented a progress report, has been converted into a Royal Commission to continue the investigations. The scope of inquiry is—(1) The present method of marketing wheat on a f.a.q. standard. (2) The establishment of a better method of handling wheat in its transportation to the seaboard. (3) Provision at country stations for the storage of farmers' grain prior to sale.

Systems of Land Tenure in South Australia.

Some interesting statistics showing the area of land under the different systems of tenure in South Australia have been made available by the Surveyor-General (Mr. E. M. Smith). The total area of the State is 243,244,800 acres, and of this 9,316,544 acres are held in fee simple. Of the remainder 617,743 acres have been repurchased for closer settlement, 163,736 acres dedicated for public purposes, 1,750,333 acres held under deferred payment system, 3,100,485 acres leased under right of purchase, 15,185,042 acres held under perpetual leases, 1,364,920 acres under miscellaneous leases, and 91,034,450 acres under pastoral leases. The area of the fresh-water lakes is 224,000 acres, and salt-water lakes aggregate in area 7,680,000 acres. The unleased vacant lands total 112,807,537 acres. The amount paid for the 617,743 acres repurchased for closer settlement totals £1,883,672 5s. 10d.

Phosphates Traffic on the Railways.

Judging from the quantity of artificial manures on the railways during the past few months it would appear that another large area will be cultivated this year. From November 1st, 1911, to January 13th, 3,089 tons were moved by the railways compared with 1,714 tons for the corresponding period of the coming season, the increase being 1,375 tons. The wheat traffic for the season shows that an additional 5,715 tons was shifted by the Railway Department.

Country Conferences.

The dates for three important Conferences of the Agricultural Bureau have now been fixed. *Upper North*.—Delegates from the Upper Northern Branches will meet at Orroroo in conference on February 28th and 29th. The agenda paper and general arrangements are in the hands of the Coomeroo Branch, who will probably have some good papers from the local Branches

for consideration. It is also expected that the Director of Agriculture (Professor Lowrie), the Wool Expert (Mr. Henshaw Jackson), the Chief Government Veterinary Surgeon (Mr. McEachran), and the Dairy Expert (Mr. P. H. Suter) will attend and deliver addresses. *Northern Branches.*—The Conference of Northern Branches will take place at Crystal Brook on March 1st. In addition to papers by Bureau members the following officers will deliver addresses or give demonstrations:—The Director of Agriculture, the Chief Horticulturist (Mr. Quinn), the Poultry Expert (Mr. Laurie), and a Government veterinary surgeon. *South-Eastern Branches.*—The South-Eastern Branches meet this year at Kingston on March 28th, when addresses will be delivered by the Superintendent of Agriculture in the South-East (Mr. W. J. Colebatch), the Chief Veterinary Surgeon, and the Director of Agriculture. Papers on suitable subjects will be presented by members of the surrounding Branches.

Export of Apples.

The export of apples from South Australia this season promises to be exceptionally large. Last season the shipments amounted approximately to 75,000 cases. This year, to date of writing, space for 180,000 cases has been arranged for, and it is anticipated that nearly 200,000 cases will be sent away. The first shipment, consisting of 6,000 cases, will be made by the *Ascanius*, which sails on February 7th. The total number of fruit boats from South Australia will be 26, and, according to present arrangements, the last to take apples will be the *Orama*, which will sail on May 3rd. The largest number of apples shipped from Port Adelaide in any previous export season was 143,145 cases in 1908, so that the shipment this season will easily establish a record. Exports from Victoria will also be heavy. The first shipment from that State will be made by the *Themistocles*, which sails early in February.

West Australian Wheat Standard.

The weight of the standard bushel in West Australia has been fixed for the present season at 62lbs. Last year the weight was 62½lbs., the same as in this State.

Californian Method of Agricultural Instruction.

A demonstration train with seven carloads of exhibits, showing the most modern methods in agriculture, started from Sacramento on a tour of Northern California on November 19th last. University experts from Berkeley and Davis travelled by the train and gave lectures at the various stopping places.

Renmark Irrigation Settlement.

The *Renmark Pioneer* of January 19th gives some interesting statistics relating to the Renmark Irrigation Settlement. The area assessed for irrigation, as given in the balance-sheet of the Irrigation Trust for the half-year ended June 30th, 1911, amounts to 5,000 acres, and the population at the present day within the irrigable area is estimated to be not less than 2,000. "On a conservative estimate," proceeds the writer of the article, "the gross value of the produce of the Renmark settlement during the year just closed amounts to not less than £100,000. . . . According to my calculations, which I believe are well within the mark, the lexia crop last year was worth approximately £20,000; sultanas, £34,000; currants, £24,000; apricots, £12,600; and peaches, £2,000. Then there are 15 tons of pears and other odds and ends to be accounted for in the dried fruits total. The output of oranges is as yet a comparatively small factor in contributing to the total production of the place—surprisingly small, in fact. Last year's crop was a heavy one in most orchards, but the total output does not appear to have been more than 7,500 cases of navels and 4,000 cases of common sorts, of a total value of approximately £5,000. . . . The olive crop last year was a very small one—less than that of the previous season—and the oil expressed amounted only to some 750galls."

Analysis of Straw.

Numerous analyses have been made by chemists of straw, from which it has been ascertained that it may be reckoned to contain on an average about 11lb. of nitrogen to the ton. There is a slight difference in the straw of the different cereals. Oat straw is the richest in nitrogen, containing nearly 16lbs. to the ton; barley straw comes next, with about 13lbs.; and wheat straw is the poorest, about 10½lbs. to the ton. The mineral constituents are also variable, as shown by the following table, taken from Ackmann's "Manures and Manuring":—

	Pounds per Ton.		
	Potash.	Phosphoric Acid.	Lime.
Wheat (winter)	18.61	5.05	7.18
Wheat (summer)	25.76	6.47	7.12
Barley	26.83	5.75	8.73
Oats	22.22	4.17	9.12

It may be noted from the foregoing particulars that a ton of oat straw returns to the soil about as much nitrogen as is contained in 1cwt. of nitrate of soda, but, of course, not in the same quickly-acting condition. The large quantity of potash taken by the straw from the soil should be observed; and, on the other hand, the explanation of the insignificant quantity of phosphoric acid in

the straw is that this ingredient passes from the straw to the grain as the plant reaches maturity; thus the grain of a wheat crop (30bush.) contains 16lbs. of phosphoric acid, and the straw of the crop only 4lbs.—*New Zealand Farmer*.

Cultivated Area of Great Britain.

The preliminary statement of the agricultural returns shows a further reduction by 51,272 acres of the cultivated area of Great Britain, arable land having decreased by 20,786 acres and permanent pasture by 30,486 acres. The acreage of wheat increased by 97,189 acres, and reached a total of 1,906,043 acres, being a larger area than has been recorded in any year since 1899. The acreage of barley, on the other hand, declined by 130,734 acres, and reached a smaller total than any yet recorded. There was practically no change in the acreage of oats, but the acreage of beans recovered the loss shown in last year's returns. The potato area increased by 6 per cent. (32,330 acres), and thus nearly reached the total recorded in 1909. Mangolds also have slightly extended, but other roots show a somewhat diminished acreage.

World's Largest Olive Grove and Cherry Orchard.

What is said to be the largest olive grove in the world is situated at Sylmar, near Fernando, Los Angeles county, and comprises 2,000 acres. The district of Young, New South Wales, boasts the largest cherry orchard in the world. It contains 30,000 trees, and has an area of 300 acres. The founder of this orchard, which was established in the old goldfield days, was an Austrian named Nicholas Jasprezza, who began his work by planting vegetables.

Continuous Growing of Wheat.

Wheat and barley have been continuously grown at Woburn since 1876 on the same land, the manures being applied every year. In 1910 the yields of wheat generally were well up to the average of the ten years 1897-1906. The unmanured plots gave 14·1bush. per acre; mineral manures alone gave rather less, viz., 12·6bush.; the produce from farmyard manure was only 18·1bush., but rape dust gave 25·1bush. The highest yield of wheat was 27·8bush., from mineral manures with nitrate of soda, the latter manure being applied in alternate years (last applied in 1909). A plot on which mineral manures and sulphate of ammonia were used and which received a dressing of 1 ton of lime in January, 1905, gave a yield of 24·1bush. The influence of lime in one

case was clearly marked for quite thirteen years. As regards quality, the wheats as a whole were poor; the best were the unmanured, minerals only, and rape dust plots; the worst the nitrate of soda and sulphate of ammonia plots. Phosphate appeared to be slightly better than potash in a mixture of manures.

Black and Grey Hairs in Wool.

Relative to the numerous complaints concerning the prevalence of black and grey hairs in wool, the following letter has been issued by the Bradford Chamber of Commerce:—"The Bradford Chamber of Commerce, Exchange, Bradford, November 18th, 1911.—Numerous complaints having been made to this Chamber of the increasing prevalence of black and grey hairs in all classes of wool a joint meeting of the Wool Merchants', Spinners', and Manufacturers' sections was convened for the purpose of finding out whether this difficulty was confined to individuals or was general throughout the trade. A very largely attended meeting was the result, and every speaker on the subject had the same complaint to make, viz., that black or grey hairs were prevalent more or less in every type of wool, both colonial and English. The Continental manufacturers have also strongly expressed their feelings to the same effect. It was pointed out by many speakers that these black and grey hairs are found in the staple and are chiefly due to the practice of breeding from the Shropshire and Down types of sheep, due no doubt to the desire to improve the quality of the carcass; whilst some speakers pointed out that in many districts the presence of a black lamb or black sheep in the flock was considered to be lucky. These black hairs are comparatively few in number, and are so spread amongst the white ones as to render it impossible to take them out by sorting, and are therefore most deleterious for all but the cheapest or darkest kinds of cloths. As the trade in pure white goods has been developed to an enormous extent and is one of the most important branches in the industry, the Wool Trade Section of the Chamber strongly desire to impress upon all growers the importance of exercising such action as they may deem expedient to remedy these difficulties, and recommend—1. That farmers should not breed from black or grey sheep; 2. That the greatest care should be taken in selecting rams from flocks as free from black hairs as possible; 3. That black and grey lambs be slaughtered. It is sincerely hoped that the prominence which is now being given will have the desired effect, including amongst others that of, where possible, selecting the breeding stock from such sheep as show the least tendency in this direction.—Jno. E. FAWCETT, Chairman Wool Trade Section; P. ANDERSON, Secretary."

ROSEWORTHY AGRICULTURAL COLLEGE.

Harvest Report, 1911-12.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College.

THE WEATHER.

No apology is needed for opening a harvest report with a general survey of weather conditions that presided over the growth of crops concerned. The controlling influence of the weather over what yields may have been secured is generally recognised; and were it to be overlooked in any discussion of the results obtained, it is probable that the latter would not always carry home the lessons that they might otherwise impart. In this connection particular interest attaches to the 1911-12 season, in that it proved to be one of the driest on our records, which date back to 1883.

In the first place I shall append below, in Table I., the year's rainfall registered at the college comparatively with the means of the preceding 28 years.

TABLE I.—*Showing the 1911 Rainfall comparatively with the Means of the Preceding 28 Years.*

Months.	1911.	Means of Preceding 28 Years.	Months.	1911.	Means of Preceding 28 Years.
	Inches.	Inches.		Inches.	Inches.
January	0·00 ..	0·92	August	0·68 ..	2·10
February ..	2·13 ..	0·45	September..	1·09 ..	1·74
March	0·66 ..	0·89	October ..	0·37 ..	1·70
April	0·33 ..	1·82	November..	0·04 ..	1·04
May	1·79 ..	1·85	December..	1·44 ..	0·76
June	2·33 ..	2·70			
July	1·56 ..	1·92	Total for year	12·42	17·89

Thus 1911 closed 5½in. below our normal average, including, from our point of view, a useless 2in. in February, and an equally useless heavy fall in December.

USEFUL. RAIN.

Whenever a crop occupies the land for portion of the year only, it is evident that the distribution of the rainfall over that special portion of the year is the factor which exercises the greatest influence on its general growth and development. From the point of view of the cereals, with which we are solely concerned for the present, this period may be said in this district to extend from April to November inclusively. It should be added, however, that early April rain, unless followed up by early May falls, is, as a rule, without much value to the crop; and that late November rains are practically useless except in very late seasons. With these reservations, therefore, I shall describe as "useful rain" in this district rain falling between the 1st of April and the 30th of November. In 1911 useful rain was represented by 8·19in. as against 14·87in., the average figure of the preceding 28 years; that is to say, useful

rain was in 1911 over 6½ in. below the mean of the preceding 28 years and over 8 in. below the mean of the past six years.

In this connection a comparison of useful rain registered in previous years of low rainfall will not be without interest. Since 1883 the years of lowest total rainfall are respectively—1885, 1888, 1897, and 1902. I have shown below in Table II., both the total and the useful rain in these four seasons comparatively with similar data for the present season.

TABLE II.—*Showing Total and Useful Rains in Years of Low Rainfall comparatively with 1911.*

Years.	Total Rainfall.		Useful Rain.
	Inches.		(April-Nov.) Inches.
1885	13.03	..	10.71
1888	12.02	..	10.78
1897	12.14	..	10.98
1902	11.65	..	7.03
1911	12.42	..	8.19

Hence it will be noted that with the exception of 1902—a year peculiarly disastrous to our crops—1911 is the lowest useful rain season on records dating back to 1883.

DISTRIBUTION OF USEFUL RAIN.

In matters of plant growth and crop yields much depends also on the mode of distribution of useful rain over the growing period of the plants concerned. In this connection, for purposes of general comparison, I have thought it well to split up useful rain into four sections. In this district I call “seeding rains” those falling in April and May; “winter rains” those falling in June and July; “spring rains” those falling in August, September, and October; and, finally, “early summer rains” those falling in the month of November.

Good seeding rains are essential to healthy, even germination; and when they fail us crops above the average cannot be anticipated. Again, these rains may prove more or less early, more or less late; now favoring early, now late cereals; now early varieties, now late ones. Thus it is a matter of very common experience in this district that the successful growing of oats is possible only when early seeding rains permit of the plants showing above ground not later than the first week in May. Similarly the general cleanliness of crops in any season is entirely dependent on the extent to which early seeding rains bring about a good germination of weeds before crops are sown.

On the other hand, given successful germination, the foundation of a good crop may be said to rest chiefly on satisfactory winter rains; and when the latter are above the average the crops may be said to be almost independent of later spring conditions, apart, of course, altogether from abnormal bouts of drought and hot weather. It is true that excessive winter rains may at times lead to poor crops as a result of undue leaching of the surface soil, particularly if the latter be at all light in texture, and that in heavy soils the crops are exposed at times to dying off from excess of moisture. Under our conditions of climate, however, these represent quite exceptional conditions; and it may be stated generally that good winter rains practically ensure at least average yields both of grain and hay.

With satisfactory seeding rains and good winter rains as a foundation, it rests with general spring conditions to determine whether yields shall be above the average or else no more than average. It is spring conditions, too, that determine for the most part whether the season is to be an early or a late one. Good rains in August, when general temperatures are beginning to rise, are almost essential to heavy crops, whether of grain or of hay. September and October

conditions set the coping stone to the edifice; if north winds set in early and both months are dry crops much above the average cannot be expected; the hay may be short, and the grain is exposed to blighting. Mildness and moistness in September and October, on the other hand, are almost certain guarantees of heavy crops. Danger, however, will continue to lurk in muggy, thundery weather, with attendant risks of red rust, whilst frosty weather may still reduce the yields of plants that are in bloom.

In this district November is the ripening month of normal seasons. At times, however, we find early varieties ripening off their grain by the first of the month, and November rains, however early, can have no influence on them. Nor for weal or for woe can they affect hay crops, the great bulk of which will in this district have been cut down before the opening of the month. On the other hand, early November rains may have considerable influence on the filling-out of the grain of late varieties, particularly in seasons that are at all late. In the great majority of cases, however, rain that falls after mid-November proves but a hindrance to general harvesting operations, and is without value to standing crops. In November we crave peace of the elements, and generally get it.

I have summarised below in Table III. the general distribution of useful rain in 1911 comparatively with the means of previous years.

TABLE III.—*Showing the Distribution of Useful Rain in 1911 comparatively with the Means of the Preceding 28 Years.*

Distribution Periods.	1911.		Means of preceding 28 Years.
	Inches.		Inches.
Seeding rains (April-May)	2.12	..	3.67
Winter rains (June-July)	3.89	..	4.62
Spring rains (August-October)	2.14	..	5.54
Early summer rain (November)	0.04	..	1.04
Total useful rain	8.19	..	14.87

A glance at Table III. will serve to show that all four periods have been below our normal rainfall, but that the principal shortage made itself felt in the spring rains. On the whole the season, in so far as the rainfall is concerned, must be considered as having been very unfavorable to the growth and development of cereals. In the first place, good seeding rains did not reach us until mid-May; hence in many instances we were compelled to sow dry, and weeds were able to make appreciable inroads into many of our crops. Late germination was an additional disadvantage that faced us this season; indeed, very few crops showed above the ground before June—a very serious handicap to late varieties of wheat, and to oats in general.

Winter rains were, on the whole, fair, although close on an inch below our normal average. In view of the extreme dryness of the spring months that followed, it may be said of these winter rains that they saved us from complete disaster; indeed, in the early spring our crops could with good reason be described as very promising.

Concerning the spring rains there is little to be said beyond the fact that, following on a somewhat indifferent winter, they were wholly inadequate to our requirements. Fortunately for us, spring drought was not accompanied by unusually high temperatures and north winds; had it been otherwise, it is difficult to see how the crops could have withstood the influence of adverse conditions.

The fact that there were no early summer rains worth recording did not materially interfere with the ripening of the crops, except in the case of a few very late varieties; for I find that our wheats ripened off progressively between the 1st of November and the 1st of December. If, on the other hand, November drought was without sensible influence on our yields, the same cannot be said of the abnormally high temperatures which obtained throughout the course of this month—on 10 days the maximum shade temperature exceeded 100 degrees Fahrenheit, and there were very few cool days to be placed to its credit. The result was that many varieties were caught in the soft dough stage, and very badly shrivelled in consequence. This shrivelling-off of the grain had a most disastrous effect on the yields of some of our most promising looking fields.

FALLOW RAINS.

It is generally claimed as one of the advantages peculiar to the practice of one year's bare fallow before wheat that the crop following is benefited to a certain degree by some portion of the preceding season's rainfall; or, in other words, that rain falling on well-tilled bare fallow is not wholly lost, but in part, at all events, is stored away in the depths of the soil for the special benefit of the crop of the succeeding season; and if such is the case, great must be the value of the practice in years of short rainfall. I am not aware of any serious attempt to measure in any given season the amount of moisture stored up in well-tilled bare fallow over and above that stored up in untilled land, or in land under crop. I may state that at the present moment I have in hand a series of experiments bearing on this subject, which I hope to publish in the course of time. In the meanwhile I shall observe that, whilst it may be taken for granted that the loss of moisture in the summer months from the surface of well-tilled bare fallow must be less than that from similar land quite bare and untilled it remains yet to be proved that this loss is less than that from similar land sheltered by a growing crop, or even merely by withered dead herbage. Personally I am inclined to think that the advantage will be found to lie with well-tilled bare fallow; I am, however, by no means confident that the difference will be found to be very great.

If, then, for the sake of argument, we assume that rain falling on bare fallow is of some direct value to the crop that follows, we may in this district distinguish by the name of "fallow rains" any rain falling between August of one year and March of the following year inclusively. In this connection 28 years' records show the mean fallow rains of the district to be represented by 9.60 in., whilst the fallow rains between August, 1910, and March, 1911, were represented by 11.41 in., *i.e.*, 1.8 in. in excess of the normal mean.

It may be inferred, therefore, that the season preceding the present one was exceptionally favorable to fallowing operations, and that 1910 rainfall must have helped along the 1911 crops. I am afraid, however, that in the present instance the inference would not be justified. It is true that I was not present during the 1910 fallowing operations; but I was back in time to observe their condition shortly after harvest. The winter months of 1910 were so exceptionally wet that very little progress could be made with the original breaking up of the fallows, with the result that portion of the fields were not ploughed up until February. Similarly only a portion of the fallows were worked over a second time before harvest, and as harvesting operations would naturally suspend any further handling of the fallows, their condition at seed time was very far from ideal. When it is recollected that, following upon the inadequate working of the fallows, seeding rains were abnormally delayed it will be agreed that we could not reap much benefit from the slight increase above the mean of our fallow rains.

ENSILAGE CROPS.

For ensilage purposes cereal crops, in a more or less green state, were cut out from four different fields. Cutting operations were started on October 3rd in the field known as "Grainger's" B, which between March 4th and 6th had been broadcasted with a mixture of King's Red wheat and Calcutta oats, at the rate respectively of 80lbs and 50lbs. each. Two hundredweight of 36/38 superphosphate to the acre had been drilled over the field earlier in the season. Growth in this field was far from rank, and eventually from 12·94 acres we secured 69 tons 8cwts. 74lbs. of green stuff, representing only 5 tons 7cwts. 35lbs to the acre.

The past history of this field is summarised below:—1908, bare fallow; 1909, purchased by the College, and sown to mixture of wheat and oats for hay; 1910, bare fallow; 1911, wheat and oats.

From "Grainger's" B we passed on to a field known as No. 7B, which had been sown to a similar mixture between May 8th and 11th. It is interesting to note that the 1911 crop of this field represented the sixth crop carried within the last seven years. No. 7B is one of the fields of the old farm, and its past history since 1897 is shown below:—1897, pasture; 1898, wheat; 1899, pasture; 1900, oats; 1901, pasture; 1902, oats; 1903, pasture; 1904, bare fallow; 1905, wheat and oats; 1906, crimson clover; 1907, pasture; 1908, maize, sorghum, and millet; 1909, barley; 1910, maize, sorghum, and millet; 1911, wheat and oats.

It will be noted that this field has been treated as bare fallow only once in 15 years, and it may be added that it is by no means a dirty paddock. From 13·7 acres of No. 7B we cut out 67 tons 2cwts. 46lbs. of green stuff, representing a yield of 4 tons 17cwts. 110lbs. to the acre, a slightly lower yield than that of "Grainger's."

In field No. 9, another field of the old farm, also broadcasted to a mixture of King's Red and Calcutta oats, we cut from 1·1 acres 5 tons 8cwts. 44lbs. of green stuff, representing 4 tons 18cwts. 60lbs. to the acre. And finally three acres of headlands in "Nottle's" yielded 10 tons 16cwts. 88lbs., or 3 tons 12cwts. 29lbs. to the acre.

The total quantity of green stuff cut for ensilage purposes was represented by 152 tons 16cwts. 28lbs.; this represented the returns from 30·74 acres, showing an average yield of 4 tons 19cwts. 47lbs. to the acre, the lowest average yield on our records. From year to year our ensilage requirements are fairly constant, and it may be remarked that this season we were compelled to cut out more than twice the area than we had hitherto allotted to ensilage; this, as will be seen later on, made serious inroads into our normal hay area.

I have summarised below in Table IV. the average returns of our cereal ensilage crops of which we have any records.

TABLE IV.—*Showing Average Yields of Cereal Ensilage Crops, 1905-1911.*

Year.	Rainfall		Average Yield per Acre.
	"Useful" Inches.	Total Inches.	
1905.....	14·23	16·71	8 tons 10cwts. 0lbs.
1906.....	16·30	19·72	11 tons 18cwts. 0lbs.
1907.....	13·81	15·06	5 tons 7cwts. 34lbs.
1908.....	15·53	17·74	7 tons 12cwts. 44lbs.
1909.....	21·15	23 05	10 tons 0cwts. 31bs.
1910.....	16·79	23·87	8 tons 15cwts. 32lbs.
1911.....	8·19	12·42	4 tons 19cwts. 47lbs.
Average for seven years			8 tons . 3cwts. 23lbs.

As will be readily understood, it is the years with abundant useful rains that give rise to the rankest growth, and consequently the heaviest yields of cereal ensilage.

It should be added here that we have, perhaps, persisted too long in associating Calcutta oats with King's Red for ensilage purposes. In this seeding mixture the wheat is very much earlier developing than the oats, and the latter never attain to their full development when the wheat crop must be cut down for ensilage; hence we usually cut less than we should otherwise do. The problem before us is the discovery of an earlier type of oat as well adapted to local conditions as the Calcutta oat.

HAY CROPS.

The ordinary farm hay crops were sown in fields No. 7, No. 9, and "Grainger's" B, representing a total area of 60 acres. The usual farm hay requirements vary between 250 and 300 tons a year; as a rule any shortage from the normal hay area is made good from the headlands of the various grain crops. In the present season circumstances unfortunately compelled us to cut out for hay important areas that had originally been intended for grain. We were driven to this procedure by the following facts:—(1) The original area allotted to hay at seed time would have been too small even in a good season; (2) we were forced to cut out from the hay crops for ensilage purposes between two and three times the area usually sufficient for the purpose; and (3) the hay crops were, on the whole, below the average.

FIELD No. 7B.

The history of this field has already been given under the heading of "Ensilage." It will be sufficient therefore to recall the fact that it had been treated as bare fallow only once in 15 years, and that in 1904; and that the 1911 crop represented the sixth crop in seven years. The area of this field is about 22 acres, of which 13·7 acres had already been cut out for ensilage, and there remained 8·36 acres that were cut for hay.

In this field maize, sorghum, and millet were sown in August, 1910, on the stubbles of the 1909 barley crop. This summer crop was fed off by the dairy herd in February and March of 1911. The summer crop stubbles were ploughed up between March 16th and 21st, rolled and cross-cultivated between March 21st and 29th. Two hundredweights of 36/38 superphosphate to the acre were drilled in on April 25th and 26th, and a mixture of 81lbs. King's Red and 51lbs. of Calcutta oats were cross-drilled in from May 8th to 11th. On the 12th and 13th of the same month 4½lbs. of Provence lucerne to the acre were hand-broadcasted and subsequently harrowed in.

The general growth was clean and uniform, and we took from it 21 tons 13cwt. 54lbs. of hay, representing an average of 2 tons 11cwt. 95lbs. to the acre.

FIELD No. 9.

The known history of this field, which was not dealt with under "Ensilage Crops," is indicated below:—1898, bare fallow; 1899, wheat; 1900-1903, grazed; 1904, sorghum; 1905, barley; 1906-1909, grazed; 1910, maize; 1911, wheat and oat hay.

It will be noted that this field has not been treated as bare fallow since 1898, and that for eight years out of 14 it has been merely grazed. The original area was close on 20 acres, but encroachments by the poultry yards on the one hand and threshing area on the other has reduced it to 10 acres; of these 1·1 acres were cut out for ensilage, and there remained, therefore, 8·85 acres for hay.

The maize stubbles were broken up with the plough late in February, and the field was subsequently both rolled and harrowed. Two hundredweight of

RELATION OF BALL OF BINDER TWINE TO QUANTITY OF HAY CUT.

When one is calculating the dimensions of a stack, or, again, when one contemplates selling hay in the stook, it is a great advantage to have a fairly accurate method of estimating the amount of hay available in the field. Most farmers base their calculations in this direction on the quantity of twine used in binding the crop. As all our crops are put over the weighbridge before being stacked, I thought it well this season to keep an accurate account of the amount of twine used in each field. The results noted on the subject are summarised below in Table VI.

TABLE VI.—*Showing Relation of Ball of Binder Twine to Quantities of Hay Cut in Various Fields in 1911.*

Area Cut.	Yield per Acre.	Character of Hay.	Total Twine Used.	Hay Cut to the Ball of Twine.
Acres.	Tons. cwts. lbs.		No. of Balls.	Tons. cwts. lbs.
17-21	2 9 50	Thick, well grown	14	3 1 53
18-77	1 12 35	Fairly tall	12½	2 8 66
105-03	1 0 10	Poor, short	51	2 1 41
17-19	1 16 41	Fair, tall	14	2 4 74
27-90	1 12 41	Fair	15	3 0 22
14-00	1 17 1	Tall, well grown, but blighted by red rust	14	1 17 0
		<i>Mean.</i>		
200-1	1 8 6	—	120½	2 6 65

Thus in 1911 the average quantity of hay cut to the ball of binder twine was represented by a little over 46½cwts. It is true that this season we had no exceptionally heavy crops to work upon. It may be said that on the one hand we had to deal with very good average crops, and on the other with very poor ones, going a little over a ton to the acre. It will be noted that the greatest quantity of hay cut to the ball of twine was represented by 3 tons 1cwt. 56lbs., and the lowest by 37cwts. The latter was secured from 14 acres of very well grown experimental plots, which had been completely blighted off by red rust. In view of the variety in character of this season's crops I am inclined to think that this year's average, viz., about 46cwts. to the ball of twine, may be taken as a fair average for ordinary seasons. I propose in future years keeping similar records with a view to noting the variations that may arise from season to season.

OAT CROPS.

We have the experience of many years to prove that even in normal seasons general conditions do not favor much the production of heavy grain crops of oats on the College Farm, and any unusual degree of drought only serves to emphasize this position; hence of late years we have confined our oat crops to the immediate requirements of our stables. In the present season the area under oats was limited to 22.82 acres, and we have reason to congratulate ourselves that it should have been so, since in the end the season proved unusually unpropitious to oats.

It is our experience—and indeed, I believe, the experience of the district—that a good grain crop of oats cannot be expected in ordinary circumstances, except the plants show well above ground in the first week of May; and, allowing for an interval of 10 to 12 days between seeding operations and this contingency, not only should seeding take place towards the latter portion of

April, but it should be accompanied by a fall of rain sufficiently heavy to bring about immediate germination. Unfortunately in this important essential 1911 opened very unpromisingly for oats, for what may be termed "germinating" rains did not reach us until mid-May, and oats that had been sown dry late in April did not show above ground until early June—altogether too late for successful growth, except in the latest of seasons. Short winter rains and an exceptionally dry spring did not serve to improve matters, and on the whole the oat crop proved, not unexpectedly, poor.

The bulk of the oat crop was sown in the western portion of "Nottle's" B, on land which had not been fallowed, but had been hurriedly broken up in February, 1911. The Calcutta oats were drilled in at the rate of 80lbs. to the acre on April 21st and 22nd, with the land in dry condition. Germination was late, and growth throughout the season poor and short; in the end we secured a yield per acre of 22bush. 26lbs. from 19·01 acres.

In "Flett's," on fallow land, we had two acre plots of Algerian and Champion oats respectively, sown on May 1st at the rate of 80lbs. to the acre. Here growth was somewhat better: ultimately the Algerian oats yielded 29bush. 11lbs. and the Champion oats 27bush. 12lbs. to the acre. In the permanent experiment field a two-acre plot of oats, following a crop of vetches, made very poor growth, yielding only 11bush. 8lbs. to the acre.

Finally, in sum total we reaped 506bush. 13lbs. from 22·82 acres, representing a general average yield to the acre of 22bush. 7lbs.

I append below in Table VII. a comparative statement concerning the oat crops on the College Farm since 1905:—

TABLE VII.—*Showing Average Yields of Oats on the College Farm, 1905-1911.*

Year.	Rainfall—		Area.	Yield per Acre.	
	"Useful."	Total.			
	Inches.	Inches.	Inches.	Bushels.	Ibs.
1905.....	14·23	16·71	20·00	43	10
1906.....	16·30	19·72	33·50	41	18
1907.....	13·81	15·06	20·00	Complete failure from feeding off	
1908.....	15·53	17·74	20·00	22	28
1909.....	21·15	23·05	23·52	43	19
1910.....	16·79	23·87	24·60	24	15
1911.....	8·19	12·42	22·82	22	8
Mean of 6 years (1907 omitted).....	—		—	33	23

In determining the mean yield of oats since 1905, I have omitted 1907, because the complete failure of the crop was attributed solely to an unfortunate experiment of mine in late feeding off with sheep in August.

(To be continued.)

PRODUCE EXPORT NOTES.

EXTRACTS FROM TRADE COMMISSIONER'S REPORTS.

The following notes have been taken from the reports of the Trade Commissioner (Mr. G. F. McCann):— London, December 15th, 1911.

ISLINGTON FAT STOCK SHOW.

One of the most interesting and instructive shows, from the breeders' and butchers' point of view, was held at Islington, in the Agricultural Hall. The establishment of this show dates back about 130 years. Latterly an innovation has been made in the form of carcass and dressed poultry exhibits with a view of demonstrating not only the varieties of different breeds in appearance on the hoof, but also enabling those interested in the meat trade to compare the relative values of different crosses and breeds slaughtered. Not only is the age and weight of cross shown, but also the individual weight of all parts—tongue, tail, head, feet, heart, liver, lights, tripe, hides, &c., as well as the age of each beast exhibited, for the information of those interested.

With the opportunities which I had in South Australia of observing the out-turn of different breeds and crosses, particularly relating to sheep and lambs, I was enabled to make comparisons between the live and dead stock shown with those of similar breed produced in our State. One feature is especially evident, and that is, in all the cases the difference between the breeds of the same type in Australia and England is very marked. No doubt the climatic conditions of South Australia in particular are such that the tendency of almost any breed is to increase in size and character, or perhaps it is that in very many instances our cross-breeding experiments have been from stock that has not been true to type. The difference was particularly evident in Dorset Horns, Leicesters, Romney Marsh, Shropshire, and Southdowns. The most noticeable feature in breeds not generally known in South Australia were the exhibits of Oxford Downs and Exmoors. Both these breeds are spoken very well of here for early maturity, and both carry good fleeces, are hardy in constitution, and should adapt themselves readily to crossing with our Merinos.

Dressed poultry exhibits were very finely displayed. Almost every known breed was staged, but as the exhibits were confined mainly to each pure breed, and not to crosses suitable for table poultry, the value of the show from an Australian point of view did not appeal so much to one interested particularly in export varieties. The ducks and turkeys were exceptionally fine, but in the former exhibits I saw nothing any better than what has been produced in South Australia.

Appended is a short list of prize-winners, with particulars as to age, weight, etc.

In the Devon Steer Class, above 2 years and not exceeding 3 years, the first prize was awarded to an exhibit by His Majesty the King, which weighed 14cwt. 0qr. 14lbs., and was 2 years and 6 months old. The winning ticket in the Hereford Steer Class was gained by a beast 1 year and 9 months old, weighing 13cwt. 1qr. 4lbs. In sheep and lambs the first prize, awarded for best pen of three crossbred lambs, was secured by a Southdown ram and Hampshire ewe cross, 10 months old, weighing 5cwt. 1qr. 7lbs. In another class of crossbred lambs, between short and long woolled breeds, the winning ticket was awarded to a pen of three Hampshire Down ram cross Devon long-woolled ewes, weighing 5cwt. 1qr. 10lbs. A magnificent exhibit carried off the honors in the Shorthorn Class, the age being given as 2 years and 10 months and the weight 15cwt. 1qr. 27lbs. Another heavy exhibit was the prizetaker in the Highland Steer Class, age 3 years and 8 months, and weighing 17cwt. The weights given should be read as live.

PRESENT DAY VETERINARY EDUCATION IN AUSTRALIA.

VISIT TO THE MELBOURNE VETERINARY COLLEGE.

By J. F. McEACHRAN, M.R.C.V.S., Government Veterinary Surgeon.

The care of live stock should certainly be one of the chief aims of any country. This can only be achieved by the presence of properly-qualified veterinary surgeons—men fully equipped in the science and art of their profession, and capable of investigating, elucidating, preventing, and curing the ailments and diseases affecting live stock.

Previous to the year 1888 no veterinary school existed in Australia, but since that date a veterinary college has been conducted in Victoria, and large numbers of its graduates hold good appointments in Federal, State, and municipal service, or are carrying on the practice of their profession in various parts of the Commonwealth.

The study of the diseases affecting the domestic animals and their relationship to human beings has brought the veterinary and medical professions into close touch with one another, and it is only right and proper that both medical and veterinary degrees should be granted by a university. The recognition of veterinary science by the university faculties is an established fact, and it is pleasing to note that two universities in Australia are now educating students in this important science.

We all appreciate the work done in country districts by the "handy" man who styles himself a veterinary surgeon, but we think the public should be informed of the extent of his qualifications, and not be gulled by any borrowed or adopted title.

The curriculum at both the Melbourne and Sydney veterinary schools embraces a course of study of very great value and importance, and covering as wide a ground as that of a medical man for the degree in human medicine and surgery. For the licentiate, *i.e.*, license in veterinary surgery, the student has to pass a preliminary examination in certain subjects and studies for four sessions at the university, presenting himself for a professional examination (written, *visu voce*, and practical) at the conclusion of each session. For the degree of Bachelor of Veterinary Science the budding veterinary student has to matriculate and take an extra course of study in a fifth session, the chief subjects being advanced pathology and bacteriology, epizootic diseases, State and municipal hygiene, vegetable pathology, entomology, and regional surgery.

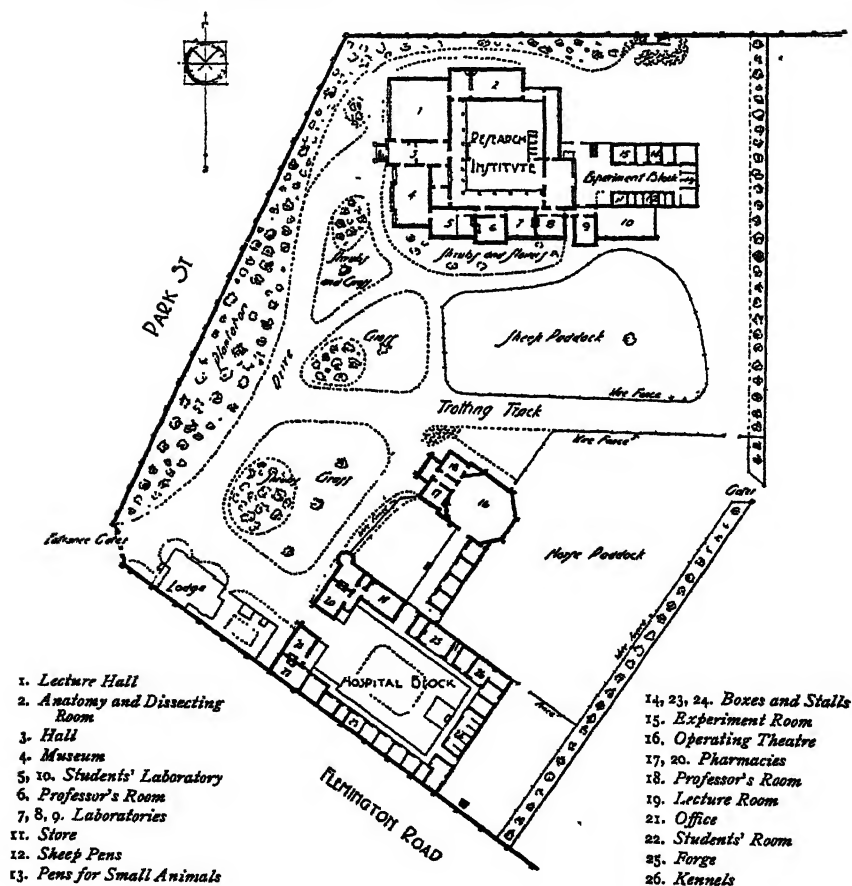
A recent visit to the Melbourne University Veterinary School and Research Institute enabled me to mark the progress made in the equipment of a modern veterinary college, and incidentally to weigh the advantages of such a training for Australian youths desirous of entering the veterinary profession.

The Melbourne University Veterinary Institute is conveniently situated—it is in a very central position, and within easy tram or walking distance from the city. The site chosen is an admirable one, and much attention has been devoted to the laying out of the grounds and the arranging of the various buildings.

UNIVERSITY VETERINARY SCHOOL AND RESEARCH INSTITUTE MELBOURNE

PLAN OF GROUNDS

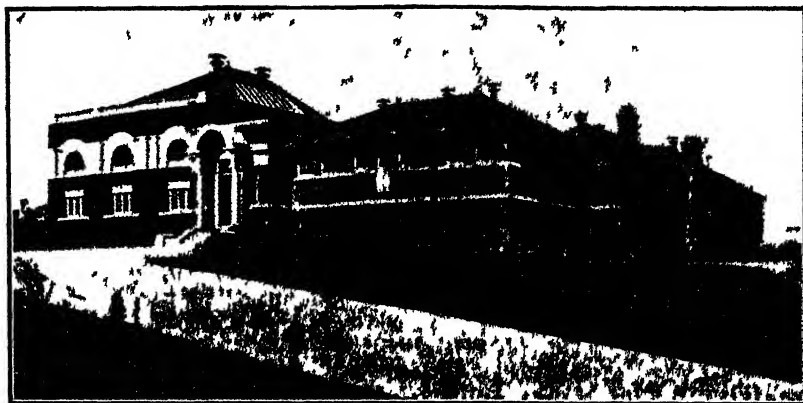
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The investigational work is conducted at the Research Institute, which comprises the research laboratories—furnished with all that is latest in the way of bacteriologic and pathological apparatus, and a museum which, although in its infancy, is already being filled with carefully prepared and preserved specimens of the various animal diseases.

The experimental block is a revelation in itself. Excellent accommodation has been provided, and there is a good collection of domestic animals besides the animals generally utilised in investigational work, *e g*, guinea pigs and rabbits. The domestic animals are housed in commodious loose-boxes or stalls, whilst the smaller animals are distributed in rooms furnished with isolation cages.

Great care is exercised in the experimental work, and clinical symptoms, temperature charts, &c., are written up daily. At the time of my visit experimental work was being carried on in connection with paralysis in horses and cattle (a disease which is very prevalent in this State), and also with worm nodules in cattle (*Onchocerca Gibsoni*), which is of immense importance to the beef industry of the whole Commonwealth.



Research Institute and Anatomy Department.

The impervious floors, the drainage, and the general arrangements of the experimental blocks are of a high sanitary order, and the proximity of the *post-mortem* room enables the carcasses to be transferred by trolley to that room, and provision has been made for the destruction of diseased animals by cremation. The anatomical and dissecting sections are replete with all the necessaries for a complete course in the study of the anatomy of the domestic animals, and subjects in different degrees of dissection can be taken into the lecture-room by special trolley, so that the lecturer can practically demonstrate his remarks.

A free clinique has been established, and animals belonging to people in poor circumstances who cannot afford the services of private veterinary surgeons are examined and treated, a nominal charge being made for medicines supplied. The free clinique is conducted at the General Hospital near the entrance to the blocks.

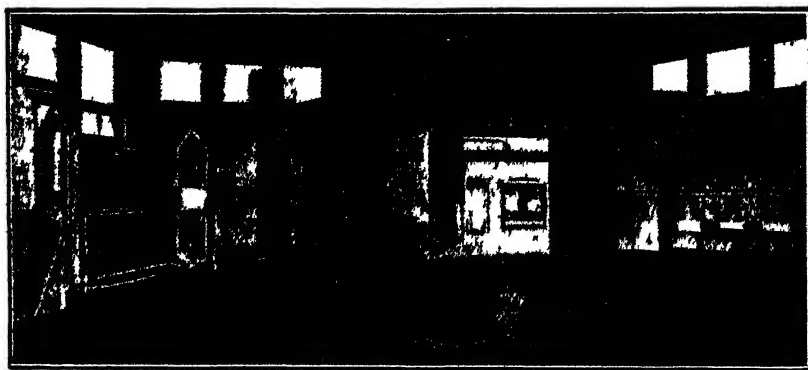
The quadrangle at the General Hospital is of asphalt, with a central lawn of grass, and here the student has ample scope for differentiating the various lamenesses from which horses suffer, as they can be examined on the hard pavement, on grass, and on sand and gravel. Besides the ordinary accommodation for sick horses and cattle, there is a specially constructed loose-box for eye and cerebral cases, and much attention is being given to the housing of sick dogs and cats (isolation rooms being provided for infectious skin

disorders). A pharmacy, a shoeing forge, and stable management room are in this division, and students have numerous specimens and ample opportunity for study in these sections.

Adjoining the General Hospital is a magnificent operating theatre, which is best described by stating that it is comparable to anything seen in our modern medical hospitals.



"Cumming" Operating Theatre and Hospital.



Interior of "Cumming" Operating Theatre.

The Lecturer in Surgery can not only demonstrate methods of operation in this beautiful theatre (in which there is a large operating table), but he can also operate in the open on a grass lawn in an area close to the theatre.

The student of to-day has undoubtedly many advantages, and if his college career is a successful one, and he pays attention to the teachings of his professors and lecturers, with a combination of common sense and tact he should prove of great service to the stockowners of the Commonwealth. The time is now ripe for this State to do its utmost to safeguard the interests of the stockowners, and the presence of so many unqualified men who term themselves

veterinary surgeons is a serious detriment to the wellbeing of the live stock. The Government scheme for the subsidising of qualified veterinary surgeons in certain districts of the State is a step in the right direction, and stockowners can learn from these notes that at the present time in Australia our young men are being trained in a very thorough manner to practise their profession. In order to protect veterinary surgeons from unfair competition and the stock-owners and the stock from unprincipled "quacks" it is very essential that a Veterinary Surgeons' Protection Bill should be introduced at an early date.



Chemistry and Physiology Departments.



Biology Department.

POULTRY NOTES.

By D. F. LAURIE, Poultry Expert.

OPERATIONS FOR FEBRUARY.

POULTRY FOR EXPORT.

The export season has commenced, and ducklings and chickens are being received at the Light Square Branch of the Produce Export Department. Advances will be made, if required, and all particulars may be obtained on application to the Poultry Expert's office, Victoria Buildings, Victoria Square, or to Mr G. A. W. Pope (General Manager Government Produce Department). Ducklings will be received until end of February, and chickens until the end of March.

Up till recently the local prices were excellent, but at time of writing the supplies on the markets have increased, and prices have receded considerably. Ducklings and chickens, suitable for export, have sold recently, at auction and privately, for less money than would have been advanced upon them if shipped. Advices received from the Trades Commissioner in London are to the effect that a good market can be expected this season. Those having suitable birds, should lose no time in communicating with the officers mentioned in the advertisement.

The birds should be well fattened, and to get in good condition should be treated as follows:—Ducklings should be penned in well-shaded, well-ventilated, cool pens—put about six or seven together. Feed on bran and pollard mixed with skim milk, if obtainable. If not, use water or add to the mash for each six ducks about 3ozs. (not more) of sweet fat, such as tallow, or mutton suet, well incorporated with the soft food. Do not use any meat or meat meal when topping off the ducklings. A little green food, cut fine, may be added, but should be omitted the last ten days. Give skim milk to drink; if not obtainable, use water, and keep either cool and clean. At about nine to ten weeks of age the pin feathers appear; these are very objectionable, and greatly increase the work of dressing the birds, and even then their appearance is marred. If full of quills it is better to keep the birds for a week or so, until the feathers grow. Needless to state, the birds lose weight during the feathering process. Good ducklings should weigh 5lbs. to 7lbs. live weight. Ducks lose weight during a journey, even if of comparatively short duration. Old ducks are not suitable for export, but will be sold in the local market at best prices.

Chickens may be from 2lbs. to 3½lbs. (White Leghorns) live weight, and are shipped as small spring chickens. Other chickens, up to 6lbs. weight, are shipped in grades. No cockerel showing spurs beyond the bird stage is suitable. Old birds, of both sexes, including young laying pullets, are not suitable, but are sold locally. Chickens should be well fattened, so as to be weighty and present a plump appearance. The legs must be clean and free from scale. To fatten chickens they may be penned in small yards or placed in coops. Bran and pollard, mixed, if obtainable, with ground maize and barley, and made into

a thick porridge with milk, will give good results. Sour skim milk may be used. If no milk is available, use water, and add a little fat to the mixture. Two or three feeds a day may be given. Milk or water may be given on hot days as extra drink. If the fattening mixture is sloppy the chickens do not require extra drink, unless the day is hot and they appear thirsty. Keep them cool, because if exposed to heat, they do not fatten well. About 18 to 20 days will make a marvellous difference in their condition and weight. Feed lightly for the first two days, so as to get the birds hungry and accustomed to the fattening mixture. Use no green food, but keep a small supply of sharp quartz grit and charcoal on hand in the coop.

In forwarding, pack ducklings in low crates; having one or more divisions; each compartment may contain three ducklings. If packed in large coops, without divisions, they will bruise one another, and their sharp claws will tear one another's back and so spoil them for export. Chickens may be packed with few divisions, say six to twelve together, according to size—the coops may be up to 1ft. 6in. high. All coops should have close-boarded bottoms, but sides and tops may be of slabs 2in. x 1in. Address the coops to the Manager Government Produce Department, Light Square, Adelaide, and send a post card, giving your name and address and number, and kind of bird sent. This information should also be attached to the crate. State also if crate is to be returned to you.

GREEN FEED.

Prepare some seed beds of rich soil and sow seeds of kail Thousandheaded, Jersey tree, Chou Moellier for transplantation as soon as plants are fit. The importance of green food, both for its food content and particularly on account of the valuable salts contained, is not sufficiently realised. At the poultry stations preparations are in progress for planting yards and other available ground with a variety of green fodder so that a large supply may be available. A plot of ground should also be prepared for sowing lucerne in autumn—manure and work well in the meantime. Rape and clover are also valuable, and should be given a trial. A breeder cannot have too much green food, and if he can grow enough lucerne to make into hay his birds will benefit. Lucerne hay is rich in salts and produces eggs of good rich color, even in the summer.

Where no green fodder is available, sprout some grain in shallow boxes—galvanized-iron cases are excellent for the purpose—keep them in the shade, and water as require. This is an excellent plan. The grain may be used in small quantities when the sprouts are just showing, or later on when the shoots are several inches long, in quantity.

AN ESSENTIAL TO SUCCESS.

Breeders with stiff backs and slow gait rarely succeed with poultry. Like every other undertaking, there must be a due amount of energy and genuine interest in the work. You cannot succeed in five minutes—long-sustained, properly-directed effort will lead to success. You must use proper food, and the birds must be punctually attended to. Water must be fresh and sweet and kept in the shade and in sterilised vessels. Attend to all doors, gates, and yard fences, and deal rigidly with foxes, hawks, crows, and stray cats and dogs. You cannot well combine distant pleasures with your business. You must first see to your birds, and see to them secondly, and every time. At the proper season you can arrange to go on a jaunt.

INSECT PESTS.

From several poultry yards the inspectors have recently brought in some lively samples of poultry ticks. There is great carelessness on the part of

breeders, and many of them appear to be purblind. As a rule when asked if there are any ticks on the premises, the answer is "No." Inspection shows ticks in plenty. It is a reflection upon a number of people that it is necessary to lodge formal and imperative orders to abate the nuisance. Why cannot the average breeder act as a citizen should by seeking out the infected parts and eradicating all ticks and lice. In Victoria the officials destroyed infested poultry and burned down all buildings harboring the ticks. This will be necessary here unless owners take heed. For method of destroying ticks write to the Poultry Expert.

THE STOCK.

Select the cockerels you wish to remain for stud purposes, and fatten and dispose of the balance. On visiting the average farm, or poultry yard, one generally sees numerous male birds serving no good purpose; but, on the other hand, consuming valuable food and occupying the room of profitable pull ts.

The Pullets should be kept growing, and may with advantage be transferred to new ground. Cull out all inferior or deformed specimens and dispose of them. It does not pay to rear wasters of any sort.

The Hens are now moulting, and those which moult quickly will soon lay and give plenty of eggs, if well fed, when prices are high. Select a pen or two of such hens and mate them in March to a vigorous cockerel and hatch as many chickens as you can before the cold weather. In the North you can continue hatching until August—then leave off. Old and unprofitable hens, if fat, should be disposed of without delay.

Old Male Birds are frequently kept on farms as heirlooms perhaps; but not for utility nor ornament. Such antiques are, as a rule, valueless for breeding from, and should be replaced by younger, more vigorous, and better-bred birds.

INCUBATORS AND BROODERS.

If you have not already done so, you should scrub these inside and outside with hot soapy water, and remove all dirt and stains. Then paint all over, inside and outside, with a 10 per cent. solution of formalin.

SERIOUS DISEASES.

Unfortunately many breeders have reported great mortality among young chickens this season. This can only be prevented by absolute cleanliness as regards incubators and brooders, and by early hatching. I shall be glad to hear from any other breeders who have suffered such losses, so that I can advise them more fully.

HOUSES, YARDS, &c.

While the days are still long you should make all repairs and alterations to your plant so as to be in readiness for autumn hatching. Later on you will be too busy to do this work.

EGGS.

A firm of importers recently published a statement to the effect that eggs shipped to the other States had opened out badly. This means a loss, and also gives a bad name to our producers. Whose fault is it? Do you market only fresh infertile eggs, gathered at least once a day, and do you promptly coop up all broody hens? Do you pack your eggs properly and dispatch them frequently? Are you not interested in keeping up a good name for our produce? Do you not wish to give the merchant a square deal by selling only good infertile eggs? These matters are within your power to improve and adjust.

We can build up a huge trade in years to come, but this trade cannot be founded on rotten eggs. Our farmers have a good name as "farmers," but the eggs that arrive in the city lead one to regretfully discount the statement.

When I had finished speaking at the September Conference many of the farmers present agreed that the farmers of the State should amend their ways as regards collecting and marketing eggs. Poultry-breeders need not wait until the millennium; they can start now and adopt modern methods.

THE FERTILITY OF HEN EGGS.

The following report on the fertility of hen eggs has been forwarded to the Director of Agriculture (Professor Lowrie) by the Poultry Expert (Mr. D. F. Laurie):—

The question is frequently asked, "How long after the removal from the pen of the male bird will the eggs laid by the hens prove fertile?" In connection with other tests the following was made at the Roseworthy Poultry Station. The male bird was removed on December 12th, and each day's eggs were dated as gathered. These were placed in lots of about 30 in some hot water machines of small capacity. It was intended to test 10 eggs each day, but the moulting season caused irregular laying. The eggs laid on 24 successive days were used in the test. It is noticed that the eggs laid on December 26th, 14 days after removal of the male bird, were infertile, but on 27th and 28th there were two eggs and one egg respectively which proved fertile.

After the seventeenth day from the removal of the male bird no fertile eggs were obtained. The 50 per cent. limit is reached in this case on about the eleventh day after removal of the male bird. The general rule is to allow seven days as the extreme limit up to which eggs may be set. In this test the fertility was high.

The following table gives the actual result:—

Fertility Tests.—Male Bird Removed December 12th.

Date Eggs Laid.	No. of Eggs Set.	No. Fertile.	No. Infertile.	Per cent. Fertile
December 12th	10	10	—	100
" 13th	10	10	—	100
" 14th	10	10	—	100
" 15th	10	9	1	90
" 16th	10	10	—	100
" 17th	9	7	2	77·7
" 18th	10	9	1	90
" 19th	10	9	1	90
" 20th	10	8	2	80
" 21st	10	7	3	70
" 22nd	6	3	3	50
" 23rd	7	3	4	42·8
" 24th	6	3	3	50
" 25th	10	2	8	20
" 26th	7	—	7	—
" 27th	10	2	8	20
" 28th	10	1	9	10
" 29th	10	—	10	—
" 30th	10	—	10	—
" 31st	9	—	9	—
January 1st	10	—	10	—
" 2nd	10	—	10	—
" 3rd	10	—	10	—
" 4th	10	—	10	—

DISTRICT VETERINARY SURGEONS.

THE GOVERNMENT SCHEME.

The scheme for the establishment of qualified veterinary surgeons in country districts, which was drawn up by the Chief Inspector of Stock (Mr. T. H. Williams) and the Government Veterinary Surgeon (Mr. J. F. McEacharn), has been approved by the Minister of Agriculture (Hon. J. P. Wilson), and will, it is anticipated, shortly be put into operation. In the past farmers and others have sustained severe losses through not being able to secure at a reasonable cost the services of competent men to treat their stock when the latter were suffering from ailment or accident. The scheme now adopted is designed to remove this difficulty, but its success will largely depend on the farmers themselves. For the time being it is intended to place veterinary surgeons in seven districts (not including Adelaide, where three veterinary surgeons are already in practice), but the Minister states that should the farmers give the scheme the practical support which it undoubtedly warrants, each year will witness an extension of the system until fully 20 veterinary surgeons shall have been appointed in the State.

DETAILS OF THE SCHEME.

The full details of the scheme are as follow :—

1. Division of populous portions of the State into seven districts, to be designated as follows:—No. 1, South-East; No. 2, Yorke's Peninsula; No. 3, Central; No. 4, North; No. 5, Southern; No. 6, Murray; No. 7, Upper North.

2. Only duly qualified veterinary surgeons to be appointed, *i.e.*, men holding a recognised British or Australian Degree.

3. Conditions of Appointment.—District Veterinary Surgeons with departmental duties, to wit—(a) Immediate notification of the Stock and Brands Department of contagious diseases discovered amongst stock in the district. (b) Twelve lectures yearly on preventive measures and first aid methods to be given in district on itinerary and syllabus to be arranged; the department to allow the officers railway fares or horse hire when so engaged.

4. The District Veterinary Surgeon shall be subsidised by the Government for three years, and shall be paid at the rate of £150 for the first year, £100 for the second year, and £50 for the third. The subsidy to be paid monthly. He shall have full scope for private practice, but shall charge farmers and stockowners at the following uniform rates :—

Visit and advice to be charged on a radius basis at rate of 1s. a mile each way beyond radius of five miles, within five miles 10s. per visit. Operations and medicine extra. No major operation to exceed the sum of £5 5s., and no minor operation £1 1s. Medicines to be supplied to clients at not exceeding retail chemists' rates.

5. The District Veterinary Surgeon may at certain times be deputed to carry out investigational duties for the Stock and Brands Department, and for such

he shall receive a fee of £3 3s. per day and actual travelling expenses in addition to the subsidy already specified.

6. The District Veterinary Surgeon shall sign a legal agreement on lines of suggested agreement attached.

7. On the expiration of the three years the District Veterinary Surgeon may be requested to continue as a departmental officer for the notification of contagious diseases and delivery of lectures at fees to be paid by the department for services rendered.

Applications for the positions closed on January 30th, more than sufficient being received. The majority of the applicants are young graduates from the Melbourne Veterinary College, and the final appointments will be made by the Minister at an early date.

The scheme as adopted should meet the demand of stockowners for qualified veterinary surgeons to attend their stock. In all parts of the State are to be found unqualified practitioners, some of whom for common ailments of stock often prescribe drugs of doubtful properties to cure mysterious diseases. Although such men term themselves veterinary surgeons, the majority of farmers are under no misconception with regard to their standing, but as many of them are nomadic in their habits, stockowners have no opportunity until too late of recognising the able from the pretentious.

The present scheme aims at the suppression of quacks and the stoppage of the sale of drastic or useless nostrums. There have been repeated demands from all parts of the State for veterinary advice, and the State departmental officers, although they respond to a large number of calls, have been unable to personally attend cases a long distance from headquarters, or, at any rate, in time to be of any practical use in saving the affected animals. There is an evident desire on the part of stockowners to utilise the service of the district veterinary surgeons, and it is anticipated that full support will be accorded them when they start practice in their respective districts.

Stockowners should, however, recognise the futility of calling in a skilled veterinary when an animal is practically in a dying condition; his advice should be sought as soon as possible.

The scale of charges fixed by the Minister is a moderate one; the medicines can be relied on as being of first-class quality, and they will be supplied at reasonable cost. Apart altogether from the practice of their profession, the district veterinaries will be able, by means of lectures and demonstrations, to disseminate among farmers and stockowners knowledge in first aid and preventive measures. They should also be of great value to the State in preventing the spread of contagious diseases. The presence of these competent men in different parts of the country will enable the Stock Department to become cognisant of practically all outbreaks, and the result should be that the loss to the State through the death of stock from contagious diseases will rapidly become a negligible quantity.

PARALYSIS OF HORSES AND CATTLE.

FEEDING WITH MUSTY FODDER.

In view of the frequency of outbreaks of paralysis amongst horses and cattle in this State the following article, taken from the *Journal of Comparative Pathology and Therapeutics*, will prove of interest to stockowners. The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) and staff are at present investigating this disease, and in this connection are conducting feeding and inoculation experiments. The work of the Government Veterinary Surgeon is being done in collaboration with Professor Gilruth, of the Melbourne University, who is also endeavoring to elucidate the cause of the disease. The article reads:—

“At the beginning of December, 1907, several outbreaks of disease of an enzootic character occurred in Lower Alsace-Lorraine, affecting horses, cattle, and sheep. The principal symptoms consisted in myopathic paresis or paralysis, and in the oxen and sheep in excessive salivation. The pulse and respirations were only increased in old-standing cases. There was no fever, and the sensorium did not appear to be affected. The disease sometimes assumed an acute or per-acute course, with rapidly fatal consequences; sometimes a chronic course, with death from inanition. Occasionally animals recovered after a very long period of convalescence. French veterinary surgeons practising on the frontier also reported similar cases.

“The greater number of cases were seen amongst animals in the village of Esesdorf and in the department of Saarburg, where 30 animals were severely attacked, and seven horses, ten cattle, and five sheep died or had to be killed. On the estate S ——— the whole of the stock, with the exception of two calves, was attacked. Altogether four horses and fourteen cattle showed symptoms. Of these, four horses and six oxen died, whilst two other oxen had to be killed. In very few cases was it possible to slaughter for the purpose of utilising the meat on account of the rapid course of the disease or the unexpected occurrence of death. On the other hand, when the animals survived longer it was equally useless to slaughter, because the flesh could not be disposed of amongst the peasants of the neighborhood. The chief losses occurred between Christmas and the middle of January.

“According to the report of Veterinary Surgeon Feist, which was founded on accounts given by the different owners and burgomasters, the first horse

died on the 30th September with symptoms of paralysis, and within an hour or two of being first noticed. On the 2nd January a second horse lay down after eating. Its legs quivered, it made no further efforts to rise, and died after 10 hours. The third horse was also seized with symptoms of paralysis, proved unable to rise, and only lived for two days, during which it took no food. There was no fever, nor was the pulse rate increased. The fourth horse, a 10 months old foal, died within 24 hours. On another farm a foal was found paralysed in its stall when the stable was opened in the morning. It died within half an hour of being first seen. A mare, almost due to foal, showed signs of paralysis, and died within four hours. The horses which were least affected exhibited paresis of the hindquarters, rolled about, and stumbled when walking, and after lying down were unable to rise without assistance. It is noteworthy that the paralysis extended both to the motor and sensory system. The horses did not show salivation, and in the slighter cases the appetite was scarcely diminished. The paralysis of the hind limbs slowly disappeared in from four to eight days. Certain horses which, in consequence of paresis, were unable to stand were kept in slings for as long as six weeks.

"Leveque compares the symptoms shown by severe cases in oxen with those of puerperal apoplexy; slighter cases exhibited profuse salivation reminding one of foot-and-mouth disease. Closer investigation into the cause of the salivation revealed paralysis of the pharynx, and in most cases of the tongue also. In isolated instances the animals still retained their appetite, and made efforts to masticate, though they were unable to swallow. As the paralytic symptoms proved very obstinate the animals rapidly lost condition, and those which survived recovered very slowly. As above mentioned, fever could not be detected, and the pulse and respirations were only slightly affected, except when the animals died with severe symptoms of paralysis or when death occurred slowly, in which cases the pulse and respirations increased in frequency towards the end. The animal then lay on one side with outstretched limbs almost as though already dead, though movements of the eyes and ears showed this had not actually occurred; As a consequence of the rapid wasting accompanying the condition, the patients presented a very miserable appearance. In severe protracted cases the faeces later became pultaceous, dark, and very offensive.

"On one of the most severely affected farms the first ox died in three days, next a cow and an ox after an attack lasting two days, and then two cows and an ox after only one day of suffering. The animals suddenly began to tremble, lay down, and were unable to rise again. One ox, after suffering severely for 24 hours, was slaughtered. A cow, nearly due to calve, was slaughtered, not because of the severity of the paralysis, but because her weak condition rendered unlikely that she could give birth to the calf. The farmer, who had lost five sheep, stated that the disease began with severe salivation, followed by symptoms of paralysis, and death within 12 hours.

" On the 8th January, 1908, Leveque and Stang carried out *post-mortem* examinations on the bodies of a horse and two oxen. The results, however, were entirely negative, although all the internal organs, including the brain and spinal cord, were examined. No visible pathological changes could be detected with the naked eye.

" The brain, spinal cord, spleen, kidneys, and a certain quantity of urine from the animals were sent to Müller for bacteriological examination. The results appeared to indicate that the cases were due, not to an infection but to an intoxication. Nevertheless, certain facts, such as that of the disease being most fatal in horses, the occurrence of paralysis of the hindquarters, and the appearance of further cases despite the food having been ordered to be changed (this, however, it afterwards proved had not been done), left it doubtful whether the disease might not have been the infectious inflammation of the spinal cord described by Schlegel.

" Examinations of the materials sent revealed the presence in greater or less numbers of cadaveric bacilli in all organs. The streptococci or other micro-organisms described by Schlegel, which are generally easy to discover, could not be detected in the interior of any of the organs. Attempts at isolation with gelatine, agar, and malachite-green plate cultures failed, as did inoculation into mice, guinea-pigs, and rabbits. Similar results followed the examination of material obtained from a horse which had died with symptoms of paralysis on a farm in the same district, and forwarded by the district veterinary surgeon. Material was obtained from several other horses with the above-described symptoms, but as it was already markedly decomposed one of the guinea-pigs died from sepsis. The bacteriological examination therefore strengthened the presumption that the outbreak of disease was due to food poisoning.

" An interview with Veterinary Surgeon Feist resulted in the conclusion that the disease might be due to feeding with food affected with "rust" fungi, or similar fungoid poison, although the grain had up to that time not been suspected.

" By command of the Imperial Ministry, Müller and District Veterinary Surgeon Leveque were then commissioned to carry out *post-mortem* examinations of any further cases which might die, with the object of obtaining suitable material for further investigations and to ascertain the cause. The next case which Müller saw was that of an ox belonging to farmer S—— in Essesdorf. The animal had been lying paralysed for 14 days, and was greatly wasted, though it preserved consciousness. Bed-sores had formed on the left half of the body. The temperature was 39° C., the pulse 160, respirations 20 per minute. The fæces were dark in color and offensive. The animal was slaughtered, and on *post-mortem* examination no indication of disease could be discovered in any of the internal organs, with the

exception of the left lung, which exhibited signs of suppurative gangrenous pneumonia. As the animal had lain on the left side throughout the disease, and had suffered from well-marked pharyngeal paralysis, the pneumonia appeared clearly due to the passage of food material into the trachea.

"Five other oxen in the byre also exhibited severe symptoms of disease. All were greatly wasted, and some showed moderate salivation. Though suffering from slight paresis, they were all able to rise from the ground. Only two calves in this byre were visibly healthy.

"Inquiries which were then set on foot elicited the following facts. During the previous year the grain in Essesdorf had been severely attacked with fungi, to a greater degree in fact than for many years. The farmer declared that certain fields had become absolutely black within a few days, particularly those which had been sown late and had suffered seriously from rain, or which had been prepared by ploughing up clover. Farmer S—— at first denied having seen anything whatever of a suspicious character in his grain fields, especially having seen black patches, but the son of the burgomaster declared that his father had a large quantity of straw in the barn which was covered with black patches. Examination of this straw showed that a great deal of it was covered with black spots. It had not the bright shining appearance of good straw; it exhaled a choking smell, and when moved it proved to be very musty. When the farmer himself was questioned as to whether he had used the straw for feeding his cattle he remembered having made the attempt, but he noted that both the horses and the oxen refused it. He therefore ceased to employ it and gave straw, which the animals ate readily. On examining straw from other farms in which attacks of the disease had occurred, trusses were always found containing more or less of the incriminating black stains. Farmer S—— also remembered that the cattle had refused some of his stock of straw, and that in order to make them eat it he had had it cut and mixed with other food. That fact clearly explained why farmer S——'s stock had suffered to so marked a degree. The two calves had escaped poisoning because they received nothing but hay. A further point suggesting that the suspected straw was really the cause of the enzoötic consisted in the fact that on the burgomaster's large estate, where this straw had only been used for a short time, no marked symptoms of disease had appeared. Nevertheless, in certain respects the grain disease had made its effects felt generally amongst all classes of animals in the neighborhood of Essesdorf. According to the statements of the burgomaster and several farmers, the horses during that winter were very slack and sweated very readily under exertion, or even after half an hour's exercise. This readiness to sweat appeared due to the existence of slight paresis, produced by consuming small quantities of the musty fodder. The injurious action of the musty straw was also indicated by the fact that after its use had been discontinued by farmer S—— no other animal amongst the oxen attacked died, and

that, when seen four weeks later, the animals had already improved greatly in bodily condition.

"With regard to the botanical nature of the black deposit on the straw, the dark coloration at once suggested the presence of 'smut' (*ustilago*). On account of its color the peasants describe straw of that nature as 'brandig' (literally 'burnt'). The chaff could not be examined to detect the presence of smut, as it had all been used up. Feeding with chaff, however, did not appear to have been injurious, as the cases of disease only increased later when much straw was given. Microscopic examination of the black mycelium showed, however, that the fungus was not *ustilago* but *uredinæ*, and that the deposit represented a form of *puccinia graminis*.

"The black spots of rust were seen, when viewed with a high power, to consist of closely packed hyphæ, which had penetrated through the epidermis and bore at their ends a double spore. Those double spores develop in the spring and then infect the growing blades, on which they produce *æcidio* spores. Those *æcidio* spores when transferred to the stems and leaves of grasses, and particularly of rye, wheat, oats, and barley, produce in summer the rusty-red color, and in autumn the black-colored mycelium consisting of double-celled *teleuto* spores. The rust fungi are even more injurious than the smut fungi, for the former affect entire fields, whilst the latter are always confined to individual plants.

"To test the pathogenic action of rusty straw, guinea-pigs were fed with it for a considerable time, and the spores were injected subcutaneously into mice. The results were negative, but no final conclusions can be drawn from those observations. So far as domestic animals are concerned, it is known that temporary feeding with musty fodder is not generally very injurious, and the toxic effects are only produced after long continued administration. The exact method in which such poisoning is brought about is not yet fully clear. Similar reports had been published by Fröhner, Johow, Lameris, and Poels, and Wienke. Johow saw paralysis of the tongue, pharynx, and limbs in oxen after feeding with rusty straw and clover hay. Lameris and Poels state that the disease causes severe losses yearly in South Germany. Wienke noted salivation, redness, and swelling of the mucous membrane of the mouth, stiffness in movement, and depression in oxen after feeding with oat-straw affected with rust. All the animals recovered after change of diet. No inflammatory action of the skin or mucous membrane was noted in the above-described cases.

"Treatment consisted primarily in prohibiting feeding with musty straw and placing the animals on a nutritious diet. Horses and slightly affected oxen alone proved worth treating."

NOTES ON BERSEEM, OR EGYPTIAN CLOVER.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College.

The Hon. Minister of Agriculture has, on the recommendation of the Advisory Board of Agriculture, imported for distribution 3 tons of Berseem, or Egyptian clover. I have been asked by the Director of Agriculture to write a few notes on the general treatment and uses of this forage crop.

I must preface these notes with the statement that such advice as I am able to offer on the subject is based on observations collected by me in Egypt in 1910, coupled with a single season's experience with this crop on the Roseworthy Agricultural College Farm in 1911. It follows, therefore, that my personal experience with Berseem is necessarily limited and much of the advice tendered more or less tentative in character.

CLIMATIC CONDITIONS.

Berseem (*Trifolium Alexandrinum*) is the only winter-growing forage crop of Egypt, where, owing to the practical absence of rain, it is always irrigated. It should be noted that the winters in Egypt are characterised by their extreme mildness, frosts being practically unknown. The question, therefore, of the resistance of Berseem to frost has yet to be settled. I may remark, however, that last season on the Roseworthy Agricultural College Farm Berseem withstood without perceptible ill effects 11 mild frosts.

SOILS.

Berseem is said in Egypt to give the best results on heavy clay soils: our last year's experience at Roseworthy would appear to confirm this fact. We have, however, found it to grow well on lighter soils as well.

BERSEEM WHERE THE MEANS OF ARTIFICIAL IRRIGATION ARE AVAILABLE.

I am of opinion that on the reclaimed Murray swamp lands, in succession to a summer crop, Berseem will provide an abundant supply of winter fodder; and it is mainly with a view to the special requirements of these lands that I have recommended its introduction to South Australia. It appears to me that similar results may be expected from this crop wherever irrigation facilities are available and the winters not too severe.

CAN BERSEEM BE GROWN TO ADVANTAGE WHERE IRRIGATION FACILITIES ARE NOT AVAILABLE?

This is a question that I cannot yet answer definitely: everything, to my mind, depends on whether autumn rains are sufficiently important to induce early germination. I am doubtful of the success of the crop in seasons in which April rains are absent or insufficient to bring about good germination. In this connection I shall recall some results we secured last year.

We sowed about two acres of Berseem on April 5th, and as the soil was quite dry at the time we used water in sufficient quantity to bring about

germination. This is the only irrigation the crop received; and between June 16th and September 19th we cut out in two cuts green stuff at the rate of 9½ tons to the acre. From seeding time to the 19th of September there fell 7.67 in. of rain. I am satisfied that the yields would have been heavier had we irrigated the crop after the first cut. We could very easily have secured a third crop but for the fact that I decided to reserve it for seed.

Hence I am led to infer, provisionally at all events, that in the event of soaking rains reaching us in early April Berseem can be grown very satisfactorily without irrigation.

SEEDING.

For heavy yields it is absolutely essential that seeding operations take place as early in autumn as possible. In Egypt it is a common practice to sow out Berseem in a maize field before harvesting operations have been completed, so that it may germinate rapidly before the soil has lost its summer warmth; hence I strongly recommend, where irrigation is practicable, that Berseem be sown towards the latter end of March, and at the latest in early April. Where irrigation is not practicable I recommend sowing Berseem in April, whilst the soil is still dry, so that germination may take place on the arrival of the first rains.

In Egypt Berseem is generally sown at the rate of 40 lbs. to the acre; and sometimes more. This seeding may appear unduly heavy to those who are accustomed to sow lucerne and clover at much lower rates. It should be pointed out, however, that in its first growth, at all events, Berseem sends up a single shoot, and if thinly sown would only cut out lightly. Last year we broadcasted the seed at the rate of 30 lbs. to the acre, and were quite satisfied with the results. I intend this season testing 20 lbs. to the acre and can in the meantime safely recommend 30 lbs. to the acre.

The soil should be worked down to a good fine tilth, and the seed broadcasted over a harrowed surface, and subsequently rolled in, preferably with a corrugated roller. If irrigation facilities are available it would be well to see that the ground is well soaked before seeding.

HANDLING THE CROP.

Last year we were able to start cutting operations 72 days after seeding: in Egypt, where climatic conditions are warmer, according as seeding operations have taken place more or less early, the first cut is said to become available within 45 to 60 days after seeding. I must point out that Berseem is a forage crop cut in the green state and fed from day to day to live stock—dairy cattle, for instance. It is important, therefore, that the first cut be started fairly early, so that the new growth be available for the second cut by the time that the first cut has been completed; hence the first cut should be started when the crop is between 15 in. and 18 in. high. All types of live stock take to it readily, and it does not in any way taint milk.

In Egypt as many as four cuts are taken from Berseem in the course of a single winter; and where irrigation is available we should be able to do the same here, providing seeding operations take place sufficiently early. The crop may be cut down either with a scythe or grass mower according to the quantities cut at a time.

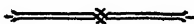
CAN BERSEEM BE GRAZED?

This again is a question which I cannot answer at present, and which I intend testing in the coming season. It appears to me, however, to be altogether too succulent for grazing purposes.

BERSEEM AND GREEN MANURING.

It appears to me that in an orchard or vineyard Berseem should make an excellent crop for green manuring; it is nitrogen-collecting. I know of no other crop that makes more rapid growth in the winter months; it is very succulent, and will therefore decay very rapidly; and, finally, in a very short space of time it makes an enormous bulk of green stuff.

Those desirous of further details on this forage crop are referred to the paper I read on the subject before the Agricultural Congress in Adelaide last September, and printed on pages 277 to 287, October, 1911, issue of the *Journal of Agriculture*.



BEE-KEEPING NOTES.

THE PACKING AND SHIPPING OF HONEY.

By T. E. WHITELOW, Inspector of Apiaries.

HONEY TINS.

The question of packages for honey is a matter of importance to beekeepers and those interested in the honey trade. The apiarist does not study the question solely from his own standpoint, but endeavors to consider the view of the clients who purchase his honey. By becoming thoroughly conversant with the methods of handling the honey after it has left his apiary, and by adapting his packages to facilitate the requirements of the trade, the beekeeper materially assists the better distribution of the product.

The usual receptacle is the rectangular-shaped tin, having a net capacity for 60lbs. of honey of a fair average density. The quantity of honey contained in a tin is largely dependent on the density of the honey, but the general rule is for the tins to contain from 58lbs. to 60lbs. The deficiency in weight is sometimes due to the tin not being completely filled. When the honey is fully ripened and matured, the tins easily contain the full weight.

A consignment of honey handled recently averaged 62lbs. net weight, and the honey was, without a doubt, one of the finest samples produced in South Australia. It was light in color, had been allowed to mature to a splendid density in its natural environment—the hive—and its flavor was all that could be desired.

The tins in present use are not strong enough to withstand ill-usage, especially if the honey is in a liquid condition, unless they are packed in cases. While in the hands of the apiarist their strength may be sufficient, because they are then handled by men who understand the care that must be exercised to prevent damage, when entrusted to the care of others, who do not have to bear the loss that careless handling entails, this is not so, and they often arrive at their ultimate destination in a battered and leaky condition. A consignment of candied honey arriving in a poor condition with the ends and corners of the tins bent inwards in a concertina fashion is a difficult proposition to handle without loss. The honey has to be liquefied in a hot air chamber, in a steam or water tank, and however careful the examination before this is done may be, it is impossible to be certain that the tins will be safe from leakage during the process, as the battered condition, combined with the fact that the honey is solid, makes the detection of small leaks very difficult. The task of soldering a small hole in a tin of candied honey is not an easy one. The presence of the hot soldering iron in the vicinity of the leak, causes a rapid expansion of the air within the tin, and draws the honey to the spot that is being soldered, thus preventing efficient soldering.

The honey trade requires a package which means the least amount of labor and leakage. Damaged tins tend to increase these items. It is a matter for consideration whether beekeepers should put up their produce in stouter tins. This point would prove an interesting discussion at some future conference of beekeepers, when various opinions could be elucidated.

At the present time tin manufacturers are using IC tin plate in manufacturing tins, and, if the thicker quality (IX) was used, the tins would be stronger. The actual method of constructing the tins has an important bearing on the strength—those resembling a kerosine tin being the strongest. It is admitted that the margin of profit to the producer of honey is not a large one, and any increase in the cost of tins is not to be treated lightly. By using stronger tins the beekeeper would protect himself and the trade from loss by leakage, and his honey would be marketed in a more presentable manner, commanding readier and more certain sales, especially in oversea markets where appearance is a strong point.

HONEY SHIPMENTS.

A really good honey harvest would demonstrate in a very apparent manner the value of our oversea markets as a means of relieving our local markets. The commercial centres which have been opened up are prepared to take all the honey the State can produce, and considerably more. Not only do they take the best quality honey, but heavy shipments have been made of dark and inferior honeys—a commodity which is unsaleable locally. It is now profitable to the beekeeper to look after the inferior grades of honey, for a sound market has been found for them.

Beekeepers should endeavor to completely fill their tins, so that they weigh as near as possible the recognised 60lb. net. Honey shipments are freighted per ton measurement, and every available square inch of the space paid for should be occupied with honey.

A shipment of 800 tins was recently made, and if every tin had been filled to its utmost capacity over a quarter of a ton more honey could have been shipped for identically the same freight charge.

DISEASES OF POULTRY.

TROUBLES WHICH BESET THE BREEDER.

No. II.

(Continued from page 630.)

By D. F. LAURIE, Poultry Expert.

The first article on the above subject, and, which appeared in last month's issue, dealt with accidents and obstructions of the oviduct. Before I can make clear the physiology of a second group of troubles affecting the organs of reproduction it will be necessary to describe those of the hen in some detail. In dissecting a hen for *post-mortem* examination it is the better plan to first take any blood specimens required for microscopical examination, then kill and pluck her. The legs, wings, and neck can now be fixed to the false top of the operating table. Make an incision across the abdomen, just including the walls of the cavity only, and taking care not to cut any of the organs. Then with a strong pair of scissors make a clean cut through the ribs on each side. Then with bone forceps cut right through the various bones on each side, when with a slight twist the sternum and ribs are lifted and the viscera are laid bare. They may now be examined in detail and specimens examined microscopically or set aside for dissection.

If the contents of the body cavity are removed, the ovary, which is generally on the left side of the vertebral column, will be clearly seen. In general appearance the ovary of a hen when functional has been likened to a bunch of grapes. The simile is somewhat of a libel on a grape-grower, because the ovules are of varying size, from the microscopic ovule up to the mature full-sized yolk enclosed in its capsule. In embryo chickens (female) there are two ovaries which can be distinguished, on the third day of incubation; one of these ovaries, the right hand one, as a rule becomes atrophied and disappears. Sometimes one finds the other ovary, but it is in a rudimentary condition. The ovary is suspended in a fold of the peritoneum from the dorsal body wall, opposite the anterior portion of the left kidney, which lies in a bony cavity. As there are in the embryo two ovaries, so also there are two oviducts, but in the adult hen one is developed and the other is rudimentary. The left oviduct, corresponding to the active left ovary, is functional and is a convoluted tube from 18 in. to 24 in. long. (See Fig. I., Plate I., January article.) The oviduct is in close proximity to the ovary, but its commencement (*ostium tube abdominale*) is not attached. It is funnel-shaped, with fimbriated edges, and is controlled by erective and contracting or grasping muscles. The oviduct, which is closely attached by membranes (a special mesentery) to the dorsal wall of the body cavity and to the gut, is of a pinkish white color, and is well supplied with blood-vessels. It is very muscular in structure, and is naturally capable of considerable distension, to which, however, there is a limit, as was shown in last article. The lower portion of the oviduct is known as the uterus, where

the egg receives its shell and pigment matter (if any) and finally rests before extrusion. The whole of the mucous membrane lining the oviduct is largely ciliated.

PLATE I.—This shows the reproductive organs of a hen (after Duval, based on a figure by Coste) and is from "The Chick" (Lillie). Here two ova are



shown in different parts of the oviduct, although normally only one is so present. The passage of the egg through the oviduct takes from 18 to 20 hours in normal cases. Reference to the illustration may, by aid of the reference numbers given, be further made clear.

1. The Ovary.—Young follicles (ovules), white, and various shades of yellow to reddish orange,

- 2 and 3. Larger follicles (ovules), reddish egg-yolk color and highly vascular.
4. Stigmata.—A non-vascular area along which rupture of the follicle takes place when the ovum is ripe.
5. An empty follicle from which a ripe ovum has been shed. These are generally yellow in appearance.
6. Cephalic lip of ostium.
7. Funnel of oviduct (*ostium tubæ abdominale*!).
8. Ovum in the upper part of the oviduct.
9. Region of oviduct where the egg white (albumen) is secreted.
10. Egg white (albumen) surrounding the ovum or yolk.
11. The ovum (or yolk).
12. Germinal disc (blastoderm, including the germinal vesicle).
13. Region of the oviduct in which the superficial layers of egg white (or albumen) and the shell membranes are secreted.
14. Lower portion of oviduct—the uterus, in which are the glands which secrete the calcareous matter which forms the shell. Here also are the pigment-secreting cells which add color to the shell of the eggs of some breeds of fowls.
15. Rectum (lower portion of bowel).
16. Wall of abdomen reflected.
17. Anus (or vent), external opening of cloaca, the pouch into which both bowel and oviduct discharge.

TRANSPLANTATION OF OVARIES.

Numerous experiments in this direction have been made with mammals, generally, until quite recently, without success. The wonderful surgical feats of Dr. Alexis Carrel, in America, in transplanting human organs indicates that success in many operations may be looked for in the near future. Some years ago (1909) in the *Journal of Experimental Zoology*, Dr. C. C. Guthrie gives an account of successful transplantations of the ovaries of young hens. Black hens and white hens were used, and the transplantations were from white to black and from black to white (both Leghorns.) A table was published showing the weight of the eggs laid by these pullets, of which there were six. Among the conclusions arrived at were—

- (1). No marked differences in egg production were found between the "control" and the operated hens, nor in the fertility of the eggs.
- (2). The eggs averaged less in weight from the operated hens than from the controls (similar hens which were not operated upon).
- (3). The ovaries transplanted in these hens seemed to function in a normal manner.
- (4). The color characteristics of the offspring appeared to be influenced by the foster mother.

Space, however, does not permit a fully detailed statement. Recent work in transplantation of the ovaries in guinea pigs has been reported as most successful.

(After the foregoing was in type I received from Dr. C. B. Davenport, of the Carnegie Institution, America, a pamphlet in which he discusses Dr. Guthrie's conclusions and gives also details of his own experiments. Space does not admit of details, but Dr. Davenport shows that in one case the ovary which he had removed and apparently extirpated was regenerated and became again functional. He also found that the transplanted ovary did not become functional, but was encysted when attached. Further experiments will be of

great interest. The fact of regeneration is most important. Dr. Davenport thinks that in Dr. Guthrie's cases transplantation was not effective and that the ovaries were also regenerated.)

PLATE II.

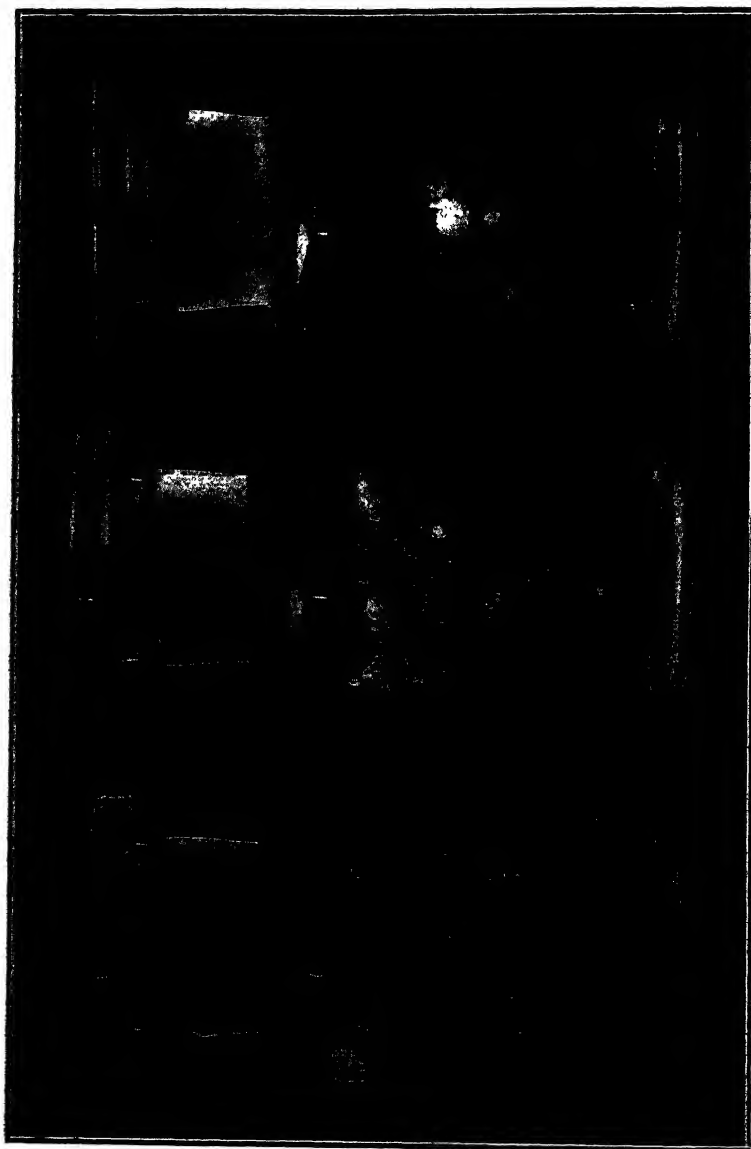


FIG. III.

FIG. II.

FIG. I.

RESECTION OF THE OVIDUCT.

Raymond Pearl and Frank M. Surface contributed to the *American Journal of Physiology* (Vol. XXII., No. III.) a paper describing the following

operation:—"Resection and end-to-end anastomosis of the oviduct in the hen without loss of function." The bird used was a pure-bred barred Plymouth Rock, and the operation was performed on January 16th, 1908. On May 17th she laid, and continued regularly. The eggs were normal in shape, and an examination of the contents showed them to be entirely normal. There was no inclusion of blood in the white of any egg. The relative proportion of albumen to yolk was substantially that of a normal egg. The chalazae of the eggs were normal. It is shown in this paper that—

1. A piece of the albumen-secreting portion of the actively functioning oviduct in the hen may be resected and an end-to-end anastomosis be made without permanent loss of function.

2. The eggs produced by a hen in which this operation has been performed are normal, except for a slightly smaller size than the average for normal hens of the same breed. Space does not permit giving more of the most interesting details. Dr. Pearl is well known as an indefatigable worker on the scientific side of poultry-breeding. His publications have excited world-wide comment.

In a future illustrated article on "The Egg" I will deal with its original formation, &c., also with its composition.

OVARIAN CYSTIC DISEASE (SO-CALLED HYDROPS OVARII):

Cystic disease of the ovaries is not confined to fowls alone, nor is the ovary the sole organ affected. Breeders, as a rule, do not make *post-mortem* examinations. The distension of the abdomen, due to growth of a cyst or cysts, is generally ascribed to a rupture, and is termed "down behind." I may mention at this juncture that in some breeds, more particularly in old specimens, fat formations are found, often of such an extensive nature as to appear as if due to cysts. When the excellent laying capabilities of some strains of South Australian fowls were demonstrated some years ago, a well-known English medico—an authority on poultry diseases—expressed the opinion that our methods of selecting for high egg production would result in various ovarian troubles. Ovarian cystic formations are due to degeneration, probably of the cells in the Graafian follicles. Doubtless forcing foods, such as stimulants and excessive animal food, may result in irritation destructive to certain cells. As a rule our breeders are careful in their methods of feeding.

After over 30 years' close acquaintance with poultry, during which time I have made countless *post-mortem* examinations, I am of opinion that there is no noticeable increase of ovarian cystic disease. This degenerative process began long before my time. While injudicious feeding may be a predisposing cause of many cases, we must not overlook the part played by heredity. That birds can be hereditarily predisposed through inherent weakness or tendency to cell degeneration cannot be disputed. My experience is that in many strains, which have been built up by close breeding, the trouble may be very common. Here the immediate cause is due to errors in breeding. Unsound stock was perpetuated. Sound, well-fed stock of the highest laying capacity are no more liable to this disease, even when line bred, than to any other disease. As a matter of fact, the majority of the hundreds of cases of ovarian cystic disease which I have examined were connected with common fowls of no distinctive breeding, and which had probably never been either forced or even well fed. So that the case may appear clear from my point of view, it is perhaps appropriate to state that my facilities for forming judgment upon this point are uncommon. As Poultry Expert I see the poultry of a great

many breeders, who refer their troubles to me and bring their birds for inspection and examination. The regular inspection of auction marts and breeders' yards by inspectors on my staff affords extensive data, and also is the means of obtaining many specimens. There are in the laying competitions at the Government Poultry stations each year several hundreds of pullets of the best laying strains in the world. These I examine at frequent intervals. Several large poulterers save any specimens they find and pass them on to me, with full particulars.

PLATE III.

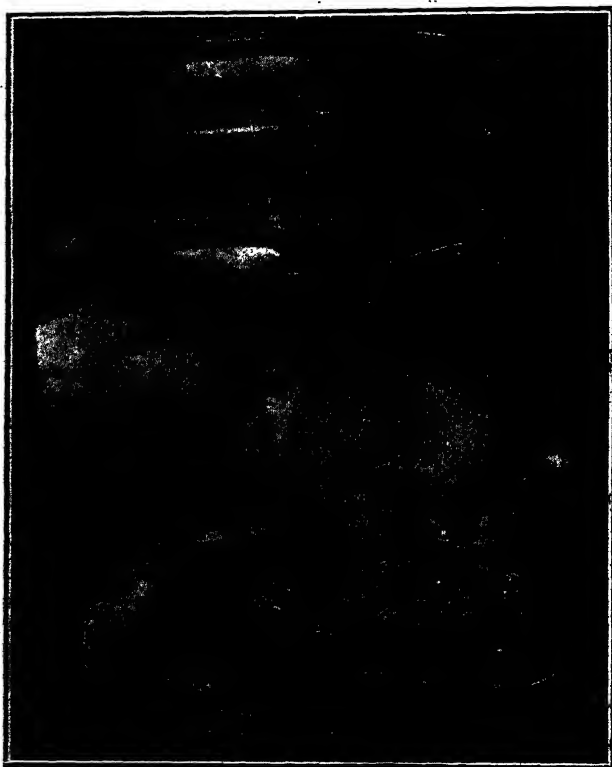


FIG. I.

PLATE II.—These specimens, Figs. I., II., III., are excised ovaries showing the multilocular cystic formations. They are reduced to one-third natural size. They were obtained from common hens seized in the markets.

FIG. I. shows an ovary in which, as far as could be seen, there was general degeneration and the cysts very numerous, and varying in size from a pin's head to one an inch in diameter. Each cyst is attached to the peritoneal fold by a pedicle or stalk, included in which are the blood-vessels.

FIG. II. shows an ovary in which similar degeneration is apparent. The larger cysts at the lower portion of the specimen are dark in appearance. When the specimen was first obtained there was evidently a considerable effusion of blood in the cyst content. Whether this was due to internal or external rupture of blood vessels was not readily discernible—most probably the wall

of the artery in the pedicle was ruptured. The condition may have been due to injury to the bird, because I have a specimen recently obtained of a normal ovary with yolks ranging from microscopic size to maturity, in which the extravasation of blood in the yolks is extensive.

FIG. III. is an ovary which has almost completely atrophied, and all the cysts, about 20, are similar in size. In this specimen the cysts are enclosed in semi-transparent membranes, while in the others the membranes are thicker and slightly tinted yellowish brown. Specimens similar to these have been mistakenly referred to as hydatids (*echino coccus*). Repeated microscopical examination of the fluid content has failed to reveal any organism. A prominent medical authority has examined similar specimens for me with like results.

PLATE III.

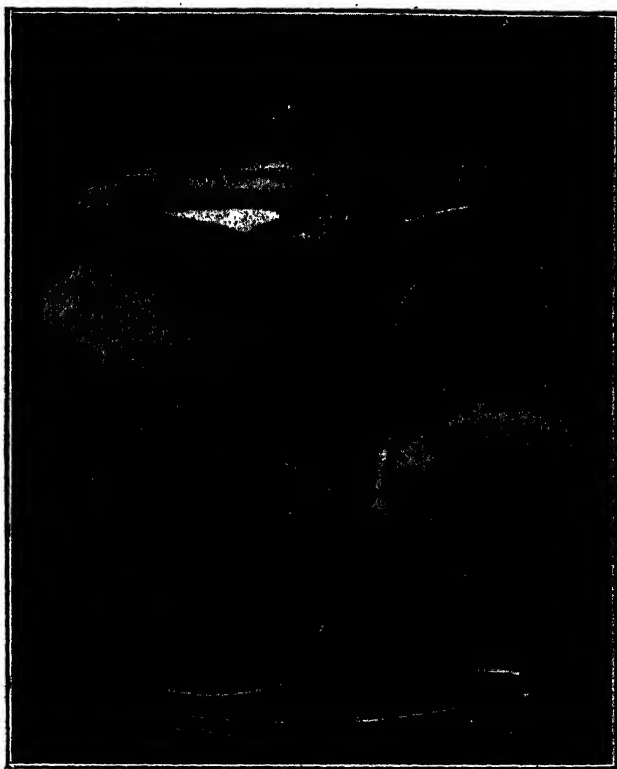


FIG. II.

PLATE III.—FIG. I. shows the excised ovary, upper portion of oviduct, and a giant cyst—all attached—reduced to about quarter size. The membranes enclosing this cyst are semi-opaque and fairly tough. There are at least two membranes—the outer one is thick and tough, and generally of an opaque, dull whitish color; the inner membrane is more or less transparent and of a shining bluish tint. In fresh specimens the ramifications of the blood-vessels are prominent, but these in the specimens in this case have disappeared from view. This specimen was removed *post mortem*, and came from a country fowl of mongrel origin.

FIG. II. shows an interesting quartet of cysts attached by pedicles to a common centre. In these some of the blood-vessels are still visible. This is a very uncommon form of the disease. It seems astonishing that hens with such an abnormal load can live and remain in apparent health. The cyst in the lower left-hand corner is almost a perfect oval in shape. In this cyst the membranes have thickened considerably, so much so that at first glance it looks like an enormous soft-shelled egg. It is well filled and the membrane fully distended. The large cyst directly above has a semi-transparent membrane, which is somewhat slack. The pedicle is supported in this case by a web or membrane, which can be clearly seen. It will be noted that in all these

PLATE IV.

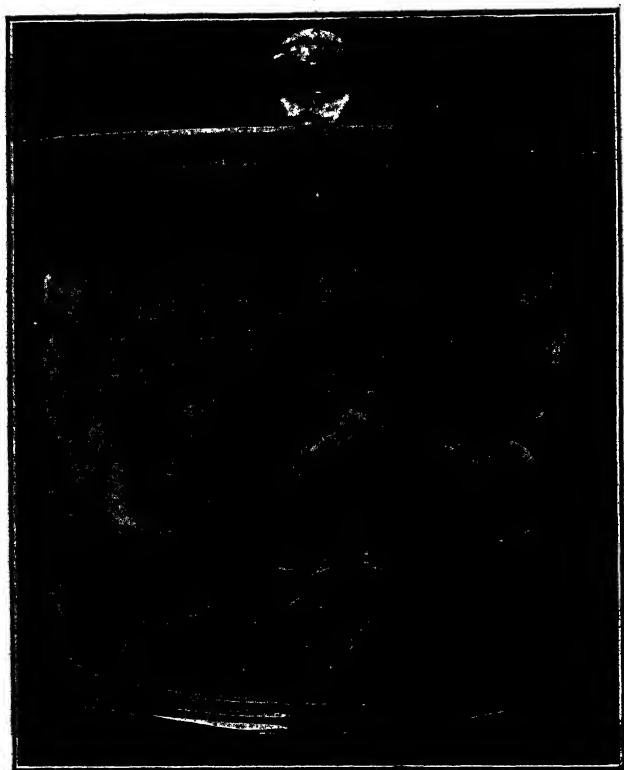


FIG. I.

specimens their specific gravity is denser than that of the formalin solution they are preserved in. This specimen was procured from a poultterer from a very fat old hen.

PLATE IV.—FIG. I. shows the contents of the abdominal cavity, with heart and lungs attached. This specimen I dissected (*post mortem*) from a large, old, Black Orpington hen, which had been under notice for some time. A few weeks previously I encountered a similar specimen and operated successfully, removing a very large cyst containing more than a quart of fluid. I made an abdominal incision and then tapped the cyst, allowing the fluid to run into

a basin. I then retracted the empty cyst, and with a pair of scissors severed the pedicle. This hen recovered, and there was no reappearance of any cystic formation when she was killed for examination a year later. In the case, as per specimen Fig I., on making the customary preliminary incision I found that all the organs were intimately included in a membrane, apparently part of the cyst. I did not have recourse to tapping, as I realised that the sac must remain. I killed the hen and removed the whole mass. The illustration shows the membranes involving all the viscera in which the cyst is embedded. The jar containing this specimen is of two-quart capacity.

PLATE IV.

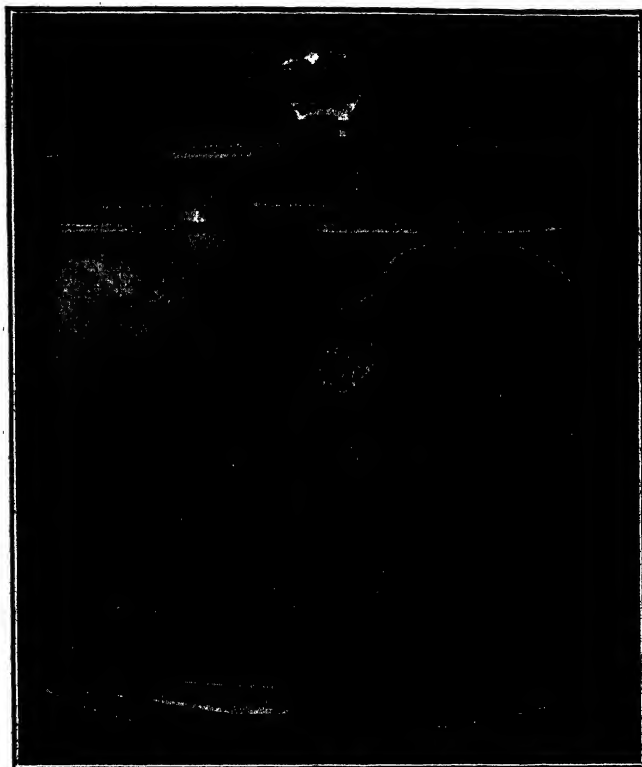


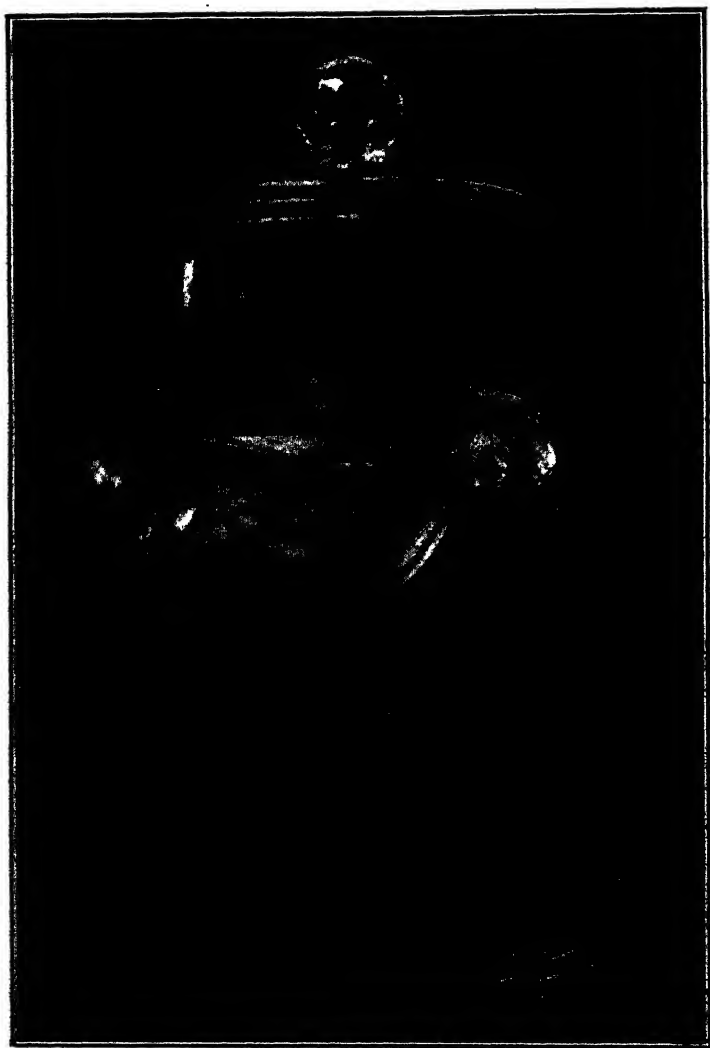
FIG. II.

FIG. II. is a cyst of peculiar but not uncommon kidney shape. This cyst is about 7in. in its long diameter by $4\frac{1}{2}$ in. to 5in. across. I operated upon a White Leghorn hen and succeeded in removing this large cyst through an incision 2in. long. The cyst was not quite full of fluid, and in such cases, after the first part is drawn through the incision, the rest flows out, and then the pedicle can be severed. In the case of large specimens for preservation I sometimes ligature the pedicle. A small cyst is attached near the pedicle. The hen recovered, but as she was in her owner's charge, I did not see her for some time. The weight of the cyst had ruptured her, and she was what her owner termed "down behind." Some months afterwards I saw her and made a fresh

incision for exploration purpose. No cystic formation was visible, but I could not relieve her pendulous condition. I believe her owner eventually killed her.

I have come to the conclusion that although the operation in removing such cysts is easy to perform, and the death-rate practically *nil*, there is no practical

FIG. V.



advantage to be gained. In one case in which I successfully operated the hen laid an egg (fully formed) an hour afterwards. In a few days she was quite recovered and was returned to her pen and laid very consistently. In another case similar results were obtained, and the hen was eventually passed out for old age.

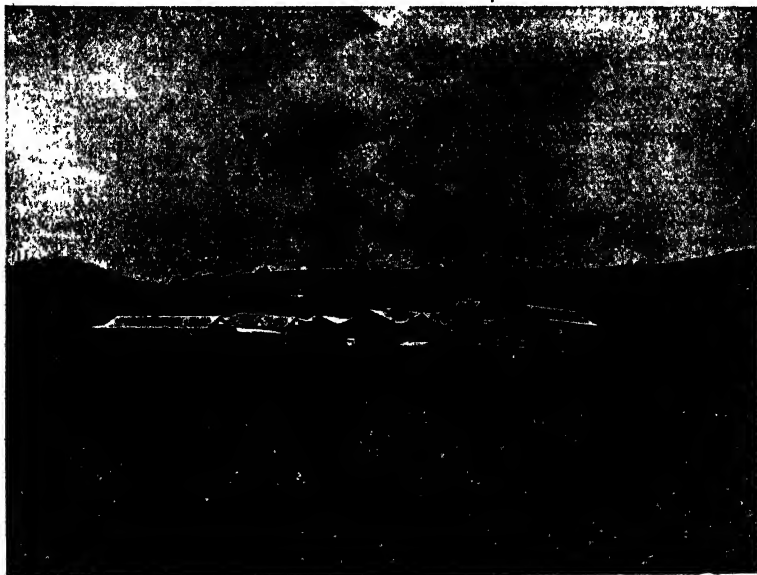
PLATE V.—In the case of this specimen we see not only ovarian cystic disease, but also a large tumor-like growth which has invaded the ovary. Attached to this tumor numerous small cysts will be noticed. The liver was full of tubercular-like nodules and had many necrotic areas on the surface, similar in appearance to the hepatitis of the *coccidium avium*. The oviduct, part of which can be seen at the rear, was in a flaccid, abnormal condition. The peculiar structure of the pedicle is shown. The hen was a common farm hen, and the specimen was handed by a poulterer to one of my inspectors.

THE NATURE OF THE FLUID OF CYSTS.

Scherer in 1852 described two substances obtained by him from ovarian cysts. These he named metalbumin and paralbumin. From these he split off a sugar radical, and, later, Landwehr prepared from these substances an animal gum. Mann ("The Proteins") says, "In normal Graafian follicles, and also in the so-called hydrops ovarii, Pfannenstiel found only albumin, presumably only serum albumin and serum globulin; while the proliferating, papillary, or glandular cystomata always contain, according to Oerum and Pfannenstiel, pseudo-mucin, which always imparts to them a more or less mucous or viscous character." Oerum found in ovarian cystomata 0.88 to 10.83 per cent. albuminous bodies.

The dissociation products are Lysin (C6, H14, N2, O2), Arginin (C6, H14, N4, O2), and 12.5 per cent. of a reducing substance; Glucosamin (C6, H13, NO5) also occurs, as it does in other glycyero proteins such as egg white.

(To be continued.)



VINEYARD AND WINE-CELLARS.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started on April 1st, 1911, and to terminate March 31st, 1912.]

Competitor.	Eggs Laid for Month ended January 31st.	Total Eggs Laid from April 1st, 1911, to Jan. 31st, 1912.
SECTION I.—LIGHT BREEDS.		
WHITE LEGHORNS (except where otherwise noted).		
The Range Poultry and Egg Farm, Toowoomba, Queensland ..	125	1,052
Cosh, A. J., Normanville	115	1,057
Cowan Bros., Burwood, N.S.W.	117	1,035
Hamill, H., Kogarah Bay, Sydney	114	980
Rhodes, H. G., Brompton	87	768
Collings, C. A., Riverton	131	1,054
Hay, C., Normanville	119	1,054
Stevenson H., Port Melbourne, Victoria	119	884
Pope, F., jun., Rockleigh	96	752
Malthouse, James, Normanville	104	987
Moritz Bros., Kalangadoo	125	1,059
Whetstone & Knappstein, Clare	112	874
Lampe, Bert, Kadina, S.A.	121	789
Collings, C. A., Riverton	128	1,089
Bertelsmeier, C. B., Clare	119	1,050
Bond, A. J., Clare	119	879
Moritz Bros., Kalangadoo	122	957
Waite, F. J. Osborne, Nailsworth	85	849
Ellery, J., & Son, Clare	119	1,019
Kempster, T. E., Lilydale, Victoria	101	813
Kinnear, Mrs. A. E., Hyde Park	129	928
Steer, W. J., Port Pirie West	115	837
Fitz-Gerald, Gerald, Mordialloc, Victoria	111	936
Featherstone, Mrs. M. A., North Croydon	117	835
Lawson, Miss N., Lower Mitcham	106	916
Provis, Mrs. W., Eudunda	128	951
Steed, J. F. T., Woodville	114	993
Uren, Mrs. P. A., Kapunda	135	1,082
Codling H., Mitcham Park	106	903
Provis, W., Eudunda	101	911
Pedder, E. A., Burnside	121	954
Tockington Park Poultry Farm, Grange	91	925
Swann, V. Roy, Jamestown	100	693
Miel, C. & H., Littlehampton	111	818
Wondatta Poultry Farm, Eudunda	92	608
Purvis, Master James, West Glenville	112	953
South Yan Yean Poultry Farm, South Yan Yean, Victoria	109	820
Sargeant Poultry Yards, East Payneham	103	924
Masey, Phillip, Alberton	112	938
Padman, A. H., Hyde Park	132	1,059
Hill Chas., Monarto South	119	849

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Mon h ended January 31st.	Total Eggs Laid from April 1st, 1911, to Jan. 31st, 1912.
SECTION I.—LIGHT BREEDS—Continued.		
WHITE LEGHORNS (except where otherwise noted).		
Read, J. D., Springhurst, Victoria	121	889
Mildren, D., Clare	137	988
Eckermann, W. P., Eudunda	106	1,008
Hurford, E. W., Grangeville	131	1,066
Sargenfri Poultry Yards, East Payneham	107	921
Shepherd, R. H., Balaklava	114	932
Rice, J. E., Cottonville	130	942
Burden, H. P., Balaklava	125	959
South Yan Yean Poultry Farm, South Yan Yean, Victoria	119	976
Keddie, R. A., Woodside	100	938
Purvis, Miss Gracie, West Glanville	107	1,012
March, H. S., Kapunda	119	937
Mildren, D., Clare	134	951
Hill, Chas., Monarto South	63	815
Marshall, J. W., Moonta	121	967
Hollands, Iru, Moonta	120	966
Dyer, P., Woodville	136	975
Edgar, R., Moonta	125	1,003
Hocking, E. D., Kadina	124	797
Purvis, W., West Glanville	104	1,064
Carling, R., Kangaroo Flat	139	1,005
Howlett, H., Moonta	132	912
Addison, Mrs. A. L., Malvern	122	860
Menkens, F. H., Henley Beach	118	1,014
Haimes, T. F., Fullarton Estate	92	873
James, Wm., Croydon	100	802
Pettigrove, T. A., Northcote, Victoria	128	920
Read, J. D., Springhurst, Victoria	117	746
Riordan, D., Kent Town	92	798
Kappler Bros., Marion	123	909
Bertelsmaier, C. B., Clare	126	995
"Koonoowarra," Enfield	121	913
Marrison & Smith, Prospect	127	939
Connor, D. C., Gawler	93	935
Thistle Stud Poultry Farm, Quorn	139	929
Uren, P. A., Kapunda	133	980
March, H. S., Kapunda	105	969
Navan Poultry Farm, Minlaton	101	744
Holmes, F. A., Frances	131	897
Lillywhite, R. G., Dulwich	97	914
Burden, Mrs. M., Islington	91	830
Coombes, E. R., Silverton, N.S.W.	118	993
Curtis, G. R., Mitcham	119	868
Roche, Mrs. N., Middle Brighton, Victoria	85	706
Mitcheson, R. H., Prospect	107	977
Hannaford, F. E., Monteith	111	879
Belcher, P. A. S., Georgetown	88	778
Whitrow, A. J., Knoxville	122	926
"Eurinima," Kybybolite	83	726
Kalms, A. G., Eudunda	112	852
Counter, E., & Foreman, Hindmarsh	96	749
Morton, T. W., East Moonta	95	712
Hall, T. C., Rose Park	100	784

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended January 31st.	Total Eggs Laid from April 1st, 1911, to Jan. 31st, 1912.
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SECTION I.—LIGHT BREEDS—*Continued.*

WHITE LEGHORNS (except where otherwise noted).

Ontario Poultry Farm, Clarendon.....	123	845
Biggs, W. D., Hyde Park.....	120	921
Tomlinson, W., Clarence Park.....	123	810
Redfern Poultry Farm, Caulfield, Victoria.....	155	1,273
Sickert, P., Clarence Park.....	103	1,055
Bennett, W. C., Magill.....	113	986
Franklin, G., Kent Town (Minorcas).....	92	866

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTON.

Brundett, S., Moonee Ponds, Victoria.....	109	873
Phillips, A., Portland, S.A.	117	852
Cowan Bros., Burwood, N.S.W.	81	859
Hutton, C., Parkside.....	93	700
Bertelsmeier, C. B., Clare.....	79	639
Tockington Park Poultry Farm, Grange.....	77	766
Padman, J. E., Plympton.....	84	834
Killara Poultry Farm, Tyatt, Victoria.....	89	753
Martin, B. P., Unley Park.....	102	950
Francis Bros., Fularton.....	71	825
Bertelsmeier, C. J., Clare.....	69	726
Padman, J. E., Plympton.....	53	793
Killara Poultry Farm, Tyatt, Victoria.....	91	891
McKenzie, E., Northcote, Victoria.....	83	947
Craig Bros., Hackney.....	105	1,037

BUFF ORPINGTON.

Ross, J. W., Somerton, <i>via</i> Glenelg.....	77	710
Hocart, F. W., Clarence Park.....	96	721

WHITE ORPINGTON.

Sykes & Harvey, Hamley Bridge.....	69	689
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SILVER WYANDOTTES.

Cant, E. V., Richmond.....	90	870
Kappler Bros., Marion.....	91	808
Burden, H. P., Balaklava.....	86	754
Redfern Poultry Farm, Caulfield, Victoria.....	82	679

LANGSHANS.

Stevens, E. F., Littlehampton.....	101	818
Jones, H. D., Broken Hill.....	86	692
Toeland, Geo., Geranium.....	111	915

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended January 31st.	Total Eggs Laid from April 1st, 1911. to Jan. 31st, 1912.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS (except where otherwise noted).

Moritz Bros., Kalangadoo	126	1,229
Sudholz, Alf., Kalangadoo	75	819
Boyce, J., Kalangadoo	91	902
"Mahama," Mount Gambier	114	1,079
"Herdafeld," Mount Gambier	113	1,004
Lewis, C., Bordertown	76	787
Staunton, S., Naracoorte	88	709
Lillywhite, R. G., Dulwich	66	870
Jarrad, J., Mount Gambier	108	1,008
Hall, C. W., Mount Gambier	90	964
Sargenfri Poultry Yards, East Payneham	115	967
Vorwerk, H. F. & A. C., Millicent	140	1,082
Lacey, F. C., Kybybolite	97	965
Kinnear, Mrs. A. E., Hyde Park	113	916
Rake, A., Kalangadoo	111	923
"Eurinima," Kybybolite	81	754
Smith, R. L., Hynam	95	742
Day, Mrs., Roseworthy	108	787
Scholz, C. H., Kybybolite	109	905
Purvis, W., West Glanville	106	953
Hannaford, Mrs. F. E., Monteith	59	896
Jenkins, Mrs. C. J. A., Kybybolite	101	881
Bertelsmeier, C. B., Clare	120	937
Navan Poultry Farm, Minlaton	79	742
Scholz, A. R., Kybybolite	88	812
Mohr, S., Tantacoola	79	882
Featherstone, Mrs. M. A., North Croydon	93	752
Toseland, G., Geranium	86	777
"Koonoowarra," Enfield	114	802
Palmer, W., Franklin Street, Adelaide	93	747
Cosh, A. J., Normanville	64	834
Queale, W., Lamercoo	106	853
Tomlinson, W., Clarence Park	101	715
Reed, A. J., Pinnaroo	114	779

SECTION II.—HEAVY BREEDS.

SILVER WYANDOTTES.

McNamara, Mrs. D., Mount Gambier	57	703
Moritz Bros., Kalangadoo	56	585
Staunton, S., Naracoorte	80	647
Burden, H. P., Balaklava	86	725
Vorwerk, H. F. & A. C., Millicent	59	693
Virgo, A. W., Bordertown	57	499

BLACK ORPINGTON.

Smith, W., Hynam	32	470
Phillips, A., Portland, S.A.	72	549
McNamara, Mrs. D., Mount Gambier	73	595
Bertelsmeier, C. B., Clare	41	498
Blue Lake Poultry Yards, Mount Gambier	38	718
Bail, H., Kaniva, Victoria	74	647

LANGSHANS.

Toseland, Geo., Geranium	96	773
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NOTES ON EGG-LAYING COMPETITIONS.

The general results are so far satisfactory, and the yield of eggs has been well maintained. At Kybybolite the birds are in full moult, while at Roseworthy the change was less marked and the moult generally light. Considering the abnormal character of last breeding season, and the weather at the beginning of the test, the general average for such a large number of birds is satisfactory. There are naturally a few self-constituted authorities who, from their statements evidently fail to grasp the true value of these competitions. It may be as well to mention some reasons for holding them—

1. To publicly test the laying capacity of the fowls of this State. 2. To encourage breeders to adopt modern methods and breed their stock on scientific lines. 3. To demonstrate that well-bred layers with good housing and methodical feeding will show a substantial profit over feeding. 4. As all the pens are not equally carefully bred as layers, the general average will approximate to what may be expected from a first-class poultry farm. These competitions are not intended—

1. To promote the interests of any particular breeder. 2. The normal is to be developed, not the abnormal. While individual scores of exceptional merit are interesting, it is far preferable that the general average of fowls owned by breeders of various degrees of experience should be good, as it undoubtedly is. 3. The fowls are not forced to lay by the use of forcing foods. This feature is an important one. By the use of forcing foods more eggs could be obtained, but at the expense of the fowls.

The Superintendents' reports are as follows:—

ROSEWORTHY.

Laying has been steady and about equal to that of the month of December. The leading pen is laying consistently; the highest weekly score was 35 and the total for the pen 1,248. In section 2 pen 103 made a score of 38 in one week, which is the best recorded for some time. In section 1 64 birds from 59 pens and in section 2 75 birds from 25 pens, have been broody. The birds are in good health. There were three deaths during the month. *Moult* has been in evidence for some time; but, although still of a general character, it is light and does not materially affect the laying. The average maximum shade temperature was 89.5, with five days over 100°, viz., 103°, 106.9°, 111°, 105.7°, 108.3°. The average minimum temperature was 54.8°, the lowest reading being 42.5°. Wind from light to strong was recorded on 28 days, chiefly from south to south-west. Only nine points of rain fell during the month.

KYBYBOLITE.

Laying has improved on last month's record, and is satisfactory considering the large number of "broodies" and the fact of the heavy moult. The leading pen has eased off for a time. In section 1 14 birds and in section 2 19 birds have been broody. The general health of the birds has been good. There were, however, three deaths due to oviduct troubles. Moulting is now general and heavy. With good weather the birds may make a quick recovery and lay well until the end of the test. The maximum shade temperature was 105°; only two days registered over 100°. The minimum temperature was 43°. No rain was recorded. Wind was recorded on 20 days, and on some occasions it was very hot and strong.

THE 1912-13 COMPETITIONS.

At time of writing entries are coming in freely. Of the other States, Western Australia, Victoria, New South Wales, Queensland are represented, and at least two pens from New Zealand will compete. Most of the leading breeders in Australia and New Zealand will be represented.

D. F. LAURIE, Poultry Expert.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, January 10th, there being present Messrs. A. M. Dawkins (Chairman, C. J. Valentine, C. Willcox, W. Miller, C. J. Tuckwell, G. R. Laffer, A. J. Perkins, T. H. Williams, Col. Rowell, and G. G. Nicholls (Secretary).

CULTIVATION OF BUCKBUSH (*SALSOOLA KALI*).

Mr. Miller proposed that the Department of Agriculture should be asked to experiment at Minburra Experimental Farm with the plant commonly known as buckbush. It was one of the best natural fodders in the dry districts, and especially useful where cattle were maintained for butter production. He had grazed milch cows on the bush in the Crystal Brook district, and had found the butter to be a better color and firmer than when the animals were supplied with any other food. Buckbush would grow almost anywhere, was equally as good as, if not superior to, saltbush for dairy cattle, and was quite as easily propagated. Mr. C. J. Tuckwell seconded. The dairymen in his district had proved the buckbush to be a valuable summer fodder.

DEMURRAGE.

The Secretary reported that a letter had been received from the Railways Commissioner, in response to the case put forward by a deputation from the board about a month ago, to the effect that he was unable to reduce the demurrage charges, but to meet the needs of the farmers was prepared to agree to the proposal of the board to allow either temporary or permanent arrangements to be made with the stationmasters for the Railway Department to unload and store goods upon arrival, thus avoiding demurrage charges. The cost to the consignee (according to the goods rates book) would be 1s. 3d. a ton for unloading. Free storage would be allowed for one day to consignees living seven miles or more from the station. If goods remained longer than that, the usual rates of storage—namely, 9d. per week per ton in sheds, 6d. on outside platforms, and 2d. in yards—would be charged. Members agreed that this would be a distinct advantage to farmers and others, and resolved to thank the Commissioner for permitting this arrangement to be made.

SUGGESTED NOXIOUS WEEDS.

Requests were received through the Minister from Stansbury and Faratoo that horehound and tobacco tree respectively should be proclaimed noxious plants. On the motion of Mr. Laffer it was decided to recommend the Minister to refer the matter to Congress, when an expression of opinion could be taken representative of the views of landholders in various parts of the State.

COUNTRY CONFERENCES.

The Secretary reported that the Conference of Upper North Branches would be held at Orroroo on February 28th and 29th, and the South-Eastern Branches at Kingston on March 28th.

NEW MEMBERS.

The following gentlemen were approved as members of the undermentioned Branches:—Kalangadoo, A. Haines; Gawler River, W. J. Dawkins, G. Higgins, H. Pederick; Dingabedinga, J. Hutchinson; Coorabie, C. Isles. J. Murray, F. Woodforde, E. Attie, J. Evans, W. Cousins, L. Bassinett, W. Fox.

FRUIT TREES AND VINES.

PROVED REMEDIES FOR COMMON DISEASES.

By GEO. QUINN, Horticultural Instructor.

Most of the common diseases of plants are caused by the depredations of small animals called *insects*, or by minute parasitic plants termed *fungi*. The insects damage the trees or vines in two ways. Some kinds, such as caterpillars and beetles, gnaw away and devour portions of the leaves, stems, roots, or fruits; whilst others, such as aphides, scale insects, and plant bugs, having no jaws for chewing, are possessed of a hollow pointed trunk or proboscis, with which they pierce the tender parts only, and suck up the sap of the plants. The chewing insects are destroyed by coating their food with a poison, such as some arsenical compound, which, when it is taken in and digested, kills the pest. The suctorial insects cannot be killed in this manner, but may be destroyed by throwing upon their bodies liquids such as tobacco wash, kerosine emulsion, or resin compound, which burn away their tender skins, or cover up the apertures through which the animals draw air; or, further, they may be suffocated with poisonous gases, such as the fumes of tobacco, carbon bisulphide, or hydrocyanic acid gas. These gases, however, are only practicable remedies where the infested plants can be enclosed within a gastight covering, such as a tent, sheet, box, or building.

Fungus diseases grow either upon the surfaces of the trees or plants or within their tissues. The mildews, of which the oidium of the grape vine is a representative, spread their felt-like growths over the surface and penetrate the skin but very slightly. These may be destroyed by dusting flowers of sulphur upon them during hot weather, or by spraying Bordeaux or Burgundy mixture upon the mildew whenever it is seen. Others, again, after germinating from spores which have fallen upon the plants, penetrate into the tissues of the fruits, bark, or leaves and make their growth out of sight within the tissues, only becoming visible to the unaided human eyesight when mature enough to give off their reproductive cells, which are called spores. These, massed together, are represented by the "black spots" of the apple and pear, the "shot-hole and scab" of the apricot, and the "curl leaf" fungus of the peach and nectarine. It is obvious that to kill these fungi when they are readily seen, the leaves or fruits wherein they are growing must necessarily be destroyed. They may, however, be *prevented* by spraying with Bordeaux or Burgundy mixture when the trees are just bursting into blossom and at slightly later periods, if necessary. *If heavy rain falls immediately after the spraying is done, before the wash has dried, the application should be repeated without delay.*

The effectiveness of the treatment depends upon three things:—(1) The use of the proper remedy. (2) Applying it at the right time. (3) Completely coating every portion of the plant usually injured by the pest in question, more particularly the leaves, twigs, and fruits.

INSECTS.

CODLIN MOTH (*Carpocapsa pomonella*).—Scrape off all dead and cracked bark from the trees; clean out all knotholes, sawing off broken ends of limbs. Keep all stakes, posts, and rubbish away from the trees. Cover up windows of apple stores with fine gauze and kill the moths as they hatch in spring. As soon as the blossoms fall, spray all apple, pear, and quince trees with a standard brand of arsenate of lead, taking care to fill the calyx end of every young fruit. Repeat the spraying at an interval of from seven to fourteen days. A third and even fourth spraying about four weeks apart may be necessary in the neighborhood of partly neglected orchards, or when late ripening apples or pears are grown. Place bandages of narrow strips of bagging about 8 in. wide around the stems or limbs, and fasten them tightly at the top end with a wire or sharp nail. Examine the bands once a week, and kill all codlin caterpillars found under them. Gather all "wormy" fruits from the trees and ground as often as possible, and heap them around the tree stem until they can be boiled, or crushed, or cut up. Don't throw them out in a raw state for animals to feed upon unless they have been submerged in water for 48 hours.

CURCULIO BEETLE (*Otiorrhynchus cribricollis*).—This insect hides in the soil during daylight and comes out at night, when it crawls up the tree stems and eats the bark of young twigs and the edges of the leaves. Where poultry can be run in the orchard, feed them with grain beneath the trees. Spray the trees with an arsenate of lead (1 lb. in 8 galls. of water) or dust the damp foliage with a mixture of Paris green and flour (one part of the poison to 30 parts of flour). They may be shaken from young trees on to sheets of cloth or paper spread beneath the limbs; kill by immersing in kerosine. Bands of "stick-fast" tied around the stems will keep back the beetle, but such bands are troublesome to keep in a moist, sticky condition.

BORING CATERPILLARS.—Scrape away the sawdust-like burrowings and kill any caterpillars found. If a hole into the hard wood is found, damp a bit of cotton waste with either carbon bisulphide or benzine, thrust it into the hole, and plug it instantly with moist clay. If neither of these are available, two or three lucifer or wax matches struck and thrust immediately into the hole before closing it with clay also suffocates these pests.

BLACK AND OTHER APHIDES ON PEACH, NECTARINE, ALMOND, ETC.—Spray whenever detected—especially just before the blossoms and leaves burst in spring—with tobacco wash, kerosine emulsion, or resin wash. Fumigate with tobacco waste or hydrocyanic acid gas within gastight covers. If the above sprays are resorted to, repeat them every second day for a week. This frequent repetition is necessary to suppress this very persistent pest, as only those struck by the spray are killed. Sticky bands will prevent them climbing up the trees.

BLACK SCALE OF OLIVE, ORANGE, LEMON, PEAR, ETC. (*Lecanium oleae*).—Thin out the twigs to admit abundance of sunlight. Spray with kerosine emulsion or resin wash. Fumigate with hydrocyanic acid gas under airtight cover.

RED SCALE ON CITRUS TREES (*Aspidiotus coccineus*).—Fumigate for three-quarters of an hour with hydrocyanic acid gas generated beneath gastight covers. This is the only effective remedy. Spraying with resin wash or kerosine emulsion will reduce but does not extirpate the pest.

RED SPIDER AND BRYOBIA MITES ON ALMOND, PLUM, APPLE, ETC.—Spray the bark and twigs with crude petroleum emulsion in winter before the buds start to burst, but kerosine emulsion should be used after the foliage forms.

MUSSEL SCALE ON APPLE TREES, ETC. (*Mytilaspis pomorum*).—Scrape away dry, loose bark from old limbs and trunks. Spray the trees from the ground to the tips of the young shoots—more especially the twigs of last summer's growth, with red oil emulsion, or crude petroleum emulsion, in the winter only.

AMERICAN WOOLLY BLIGHT ON APPLE TREES (*Schizoneura lanigera*).—Spray the patches of blight with tobacco and soap wash, crude petroleum or red oil emulsion, or resin compound. Hold the nozzle close to the affected patches and drive the spray with great force. In small gardens these washes may be rubbed in with a paint brush.

"CUTWORMS" ON TOMATOES, YOUNG VINES, ETC.—These caterpillars hide in the ground during daylight, but come out to feed upon the plants at night. They usually attack the stems of the plants at the soil line. Spray with any arsenical wash or make up a sweetened bran mash containing arsenic, such as Paris green.

FUNGI.

BLACK SPOT OR SCAB OF APPLE AND PEAR (*Fusicladiums*).—Spray with Bordeaux mixture just when the blossom buds are unfolding. Repeat the dressing after the fruits form.

SHOT HOLE AND SCAB OF APRICOT (*Clasterosporium*).—Spray with Bordeaux mixture just when the flowers are opening. In damp districts spray again when the fruits are half grown.

GUMMING BLIGHT OF PEACH, ALMOND, APRICOT, ETC. (*Clasterosporium*).—Spray with Bordeaux mixture as soon as the leaves have fallen in the autumn. Burn all prunings from affected trees.

CURL LEAF OF PEACH AND NECTARINE (*Exoascus deformans*).—Spray with Bordeaux mixture as soon as the color can be detected in the flower buds. If trees have suffered badly during the previous season, give a spraying when the buds are quite dormant. It is no use spraying upon the affected foliage.

OIDIUM OR MILDEW ON GRAPE VINES (*Oidium Tuckerii*).—Burn all prunings from diseased vines. Dust powdered sulphur (flowers of sulphur) over the shoots when about 3in. or 4in. long, and repeat the dusting just when the flowers are opening. High temperatures are necessary to enable the sulphur to become effective.

ANTHRACNOSE OR BLACK SPOT OF THE GRAPE VINE (*Spaeloma*).—Burn all prunings from affected vines. Remove all dead bark and swab the limbs, spurs, and rods with a saturated solution made by pouring $\frac{1}{4}$ pt. of sulphuric acid over 50lbs. of iron sulphate, then dissolving the iron crystals with 10galls. of boiling water. Make this in a wooden vessel, and protect both skin and clothing against splashes whilst applying the wash.

FORMULÆ FOR SPRAY WASHES.

HOW TO MAKE BORDEAUX MIXTURE.—Take 6lbs. bluestone, 4lbs. fresh lumpy quicklime, and dissolve the bluestone by hanging it over night just beneath the surface of 25galls. of water contained in a wooden tub. Slake the lime by adding a couple of gallons of water slowly, as it crumbles and gives off heat. As heat declines add more water, then strain the milky limewater into a vessel holding 25galls. of water when filled. Then stir and run the limewater and bluestone solution gradually together into a third vessel capable of holding the 50galls. Do not blend the limewater and bluestone solution until spraying is about to begin. Use a fine spray and thoroughly wet all parts of the tree. This mixture may be combined with the arsenical compounds given below, thus forming a fungicide and insecticide in one dressing.

BURGUNDY MIXTURE.—Take 6lbs. bluestone, and 11lbs. common washing soda; dissolve each separately in 10galls. of water. Dilute the bluestone solution to 40galls., and then add the soda solution. For spraying after the fruit has set, make the solution up to 60galls. instead of 50galls.

HOW TO MAKE RESIN WASH.—Resin, 10lbs.; washing soda, 10lbs.; fish oil, 1½pts. (if procurable; if not use soft soap, 5lbs.). Place the soda in a boiler with sufficient water to allow it to boil freely; when dissolved slowly add the oil or soft soap, and very gradually stir in the finely powdered resin, and then boil together rapidly for one hour, adding a little boiling water occasionally, so that it does not boil over, then add 50galls. of water. This is effective against many kinds of scale insects. It may be weakened to one-half strength for use against asphides.

TOBACCO AND SOAP WASH.—Take from 4ozs. to 8ozs. tobacco, according to the strength of the sample available (the powdered form is best), and pour over it ½ gall. of hot water. In another quart of boiling water dissolve 2ozs. of soap (hard or soft will answer). Allow the tobacco to steep over night, and then, after straining out the sediment, mix the tobacco liquor with the soap solution. If greater haste is essential, *simmer* the tobacco over a slow fire for two hours, and dissolve the soap whenever required. This is more effective if applied in a fairly hot condition and with great force.

INGREDIENTS OF KEROSENE EMULSION.—Kerosene, 2galls.; common soap, 1lb.; soft water, 1gall.; or 1gall. of sour milk instead of the soap and water. Use 1gall. in 12galls. of water.

INGREDIENTS OF RED OIL EMULSION.—Red oil, 4galls.; soft soap, 4lbs.; to make 60galls. of wash. To be used in winter only.

INGREDIENTS OF CRUDE PETROLEUM EMULSION.—Crude petroleum, 4galls.; soft soap, 4lbs.; water to make 48galls. of spray. To be used in winter only.

HOW TO MAKE KEROSENE, RED OIL, AND CRUDE PETROLEUM EMULSIONS.—Boil the soap in the water until it dissolves. Then add it boiling hot to the red oil, crude petroleum, or kerosene. Transfer it with force from one bucket to another by means of a syringe until it thickens into a cream-like substance.

ARSENATE OF LEAD.—Mix not less than 1lb. of lead arsenate paste of some approved make with 20galls. of water. It is best liquefied in ½ gall. of water before being poured into the larger quantity. It needs no admixture of limewater, but should be agitated occasionally whilst spraying is in progress. If leaves or fruits be scorched, add 1lb. quicklime to the wash. *This is superior to the Kedzie or Paris green mixtures.*

ARSENITE OF SODA (Kedzie's formula).—One pound white arsenic, 2lbs. washing soda, 1gall. of water. Boil the soda in the water till it dissolves. Then stir in the arsenic and boil until it dissolves. This usually takes about an hour. When about to spray, add 1pt. of this mixture to 40galls. of lime-water, made by slaking and straining not less than 6lbs. *freshly burnt quicklime*. Keep this mixture constantly stirred whilst spraying.

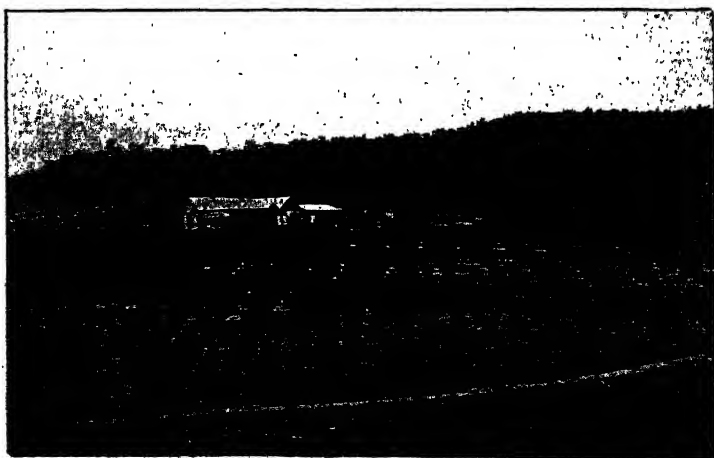
PARIS GREEN AND LIME.—One ounce of Paris green (Blundell's), ½lb. fresh lime, 10galls. water. Slake and strain the lime. Work the Paris green powder into a smooth paste with some of the strong limewater. Then add to it the remainder of the 10galls. of limewater. Keep it constantly stirred when applying, and only mist the fruits all over lightly; do not drench them.

POISON BAITS FOR "CUTWORMS."—For the caterpillars which bury themselves by day, but at night come up and eat the leaves of young vines, &c., mix 8ozs. Paris green, 4lbs. molasses or sugar, 30lbs. bran with enough water to make a stiff paste. Place about a teaspoonful of this near to each vine, but not touching the stem.

WARNING.—*Care should be taken in making, keeping, handling, or applying the Paris green, arsenite of soda, and arsenate of lead mixtures, as they are extremely poisonous.*

FUMIGATION WITH HYDROCYANIC ACID GAS.—Potassium cyanide, 98 per cent., 1oz.; sulphuric acid (commercial), 1oz.; soft water, 3ozs.; to each 100ft. to 150ft. enclosed. The tree to be disinfected must be enclosed in a gastight tent, sheet, or box, which is usually made of closely-woven sailcloth, calico, or canvas, shrunk and tanned to preserve the fabric and close the interstices in it. The cover being adjusted over the tree, and soil heaped upon the edge of the cloth nearly all around, the chemicals are mixed in a glazed or leaden bowl as follows:—Pour the water in, and then slowly add the acid, stirring the contents of the bowl with a stick when doing so if the dose be a large one. Lift the edge of the tent and place the bowl close to the tree stem. The cyanide (which should be in lumps not larger than the size of a walnut) having been duly weighed and wrapped in one thickness of paper—newspaper is suitable—is dropped into the bowl, which should be covered with a wooden or leaden lid perforated around its rim so as to permit the gas to emerge in a horizontal and downward direction. The fold of the tent or sheet must be quickly closed, and the whole of its margin on the ground covered with soil. The tent should remain closed for not less than 45min. for scale insects. This work can only be done with safety to the tree in perfectly cloudy weather or when the sun is down. For black aphides on peach, &c., the chemicals may be reduced by one-third, and the time shortened to 35min., and the work may be done in daylight.

WARNING.—*The potassium cyanide is extremely poisonous, and the acid will burn the flesh or clothing, whilst the gas is also poisonous in the highest degree. Consequently these chemicals should be kept under lock and key, and persons using them must exercise considerable care, avoiding breathing in the gas. Also wash the hands thoroughly before putting them near the mouth.*



ORCHARD AND HOMESTEAD.

THE SOYA BEAN.

INCREASING POPULARITY.

The extraordinary increase in the Soya bean trade during the past few years (writes the *New Zealand Farmer*), is one reason why this crop should be thoroughly tested in New Zealand. Another reason is that the Soya bean has been proved to be a staple legume and a restorative crop for profitable growth in rotation with maize.

THE TRADE IN BEANS.

The soya has been raised in Manchuria and Japan for centuries, but it is only during the past few years that any attempt has been made to produce the crop on a commercial scale. In those countries a small part of the oil, 6 or 8 per cent., was extracted by primitive presses, and the residual oil cake used as a fertiliser. In 1905 Japan (in addition to her own supply) imported 182,000 tons of this cake, and in 1909 she purchased no less than 600,000 tons, clearly showing how the Eastern people regard the substance for fertilising purposes. The total estimated crop of shelled beans in Manchuria for 1909 was over one and a half million tons. In England the value of the bean has become so well recognised that the *London Times* stated that this year's requirements of the bean (for oil extraction and the residual cake for cattle food) would be over one million tons. At a minimum price of £6 10s. per ton this would mean a trade of £6,500,000, but it is doubtful if the beans can be bought this year under £8 per ton. In China and Japan the beans form an important article of diet.

USE AS STOCK FOOD.

The Danes are now sending large orders for beans to Manchuria, from which it appears that they have discovered the value of the plant as cattle food. From 3lbs. to 4lbs. of soy beans per day added to the usual dairy ration of hay, fodder, and maize is stated to increase the winter milk yield of the average Kansas cow by 25 per cent. Experiments with the bean as pig food, too, have proved highly satisfactory. Not only is the bean useful, but the plant itself is a valuable fodder, and cows will readily eat it after they become accustomed to the taste. For green feed it should be cut when near the full bloom, as at this period the amount of nutrients is much higher than when cut at other stages of growth. When wanted for hay, cut when the pods are about half filled and dry; handle the same as pea hay. In the United States it is often ensiled with green maize, making an excellent succulent food, and being an almost balanced ration.

AS A RESTORATIVE CROP.

Experiments in South Africa show that when grown as a rotation crop with maize the soya bean would normally secure its requirements of fertilising ingredients from the residues of manures applied to the cereal. It may be mentioned, however, that extensive trials showed that the application of nitrogenous manures had a most deleterious effect, while the use of potash gave

consistently good results. It must be borne in mind that many of the leguminous plants depend for their successful growth on the presence of the right kind of bacteria of the soil, and on new soil there is often considerable difficulty in getting the soy plant inoculated with tubercles of nitrifying bacteria. By growing this bean for three or four years in succession on the same soil, inoculation is almost sure to result, provided the soil is not acid in reaction. If inoculated soil from an old soy bean field is not sown with the beans on new land, and the proper bacteria are not present already in the soil, it is necessary to have a fair amount of available nitrogen present to grow the plant. Numerous experiments in other countries show that on soils poor in nitrogen the soy beans, without nodules on the roots, make unsatisfactory growth. It is also recognised that any of the leguminous plants will not thrive on an acid soil, mainly because the bacteria are not in that case able to develop and thrive; therefore, the importance of the addition of lime to those lands to make them alkaline, and also of the secondary effect that the lime has of liberating potash from clays, which is so necessary for growth of legumes.

It has been definitely ascertained in America that the yield of crops of all kinds is increased where they follow soya beans; wheat in large fields showing an increase of 5 bush. per acre over that grown on land alongside that had not been under beans. Wheat generally follows a nitrogenous crop in the usual rotation schemes on the Continent. The conclusions arrived at after hundreds of experiments in other countries is that if there are no tubercles on the roots the growing bean does not add fertility to the soil, but simply makes available for other crops the plant food already in the soil. When the plants are inoculated with tubercles, undoubted increase of fertility will result in the form of available nitrogen to the soil.

TRIALS IN AUSTRALIA.

The soya bean has been hailed as one of Australia's coming crops. From experiments made there "wonderful results in Queensland," and "encouraging tests in Victoria" are reported. In Victoria 30 lbs. of seed to the acre was used, and at Cheltenham upwards of 13½ tons of green soy fodder per acre was obtained, and 10 tons per acre at Ballarat. Special sowings were made at Cheltenham on 10th October, and were cut for green fodder on 27th February. The following yields were obtained:—

Variety.	Yield per Acre.		
	Tons.	cwts.	lbs.
Ita San (yellow)	12	8	54
Baird (brown)	13	10	10
Brownie (brown)	11	6	98
Guelph (green)	11	6	98

THE WHEAT MARKET.

The Australian wheat markets during January were to a large extent governed by London, where the market fluctuated according to whether the reports received from the Argentine were favorable or unfavorable. The latest advice at the time of writing is to the effect that the London market is firm, and this, notwithstanding that according to *Beerbohm* the world's visible supply on January 1st exceeded by 1,395,000 quarters the visible supply on the same date of 1911.

The following tables, showing *Beerbohm's* revised estimate of the wheat crop of the world, as compiled on December 22nd last, and the world's visible wheat supply on January 1st should prove of interest :—

THE WHEAT CROP OF THE WORLD (Revised Estimate).
(In Quarters of 480lbs., 000 omitted).

	1911.	1910.	1909.	1908.	1907.	1906.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
Austria	7,500	7,200	7,300	7,800	6,300	7,200
Hungary	24,000	22,700	14,200	19,000	16,850	25,900
Belgium	1,800	1,550	1,750	1,750	1,950	1,750
Bulgaria	8,000	7,100	4,600	4,500	4,500	5,150
Denmark	500	550	500	500	500	500
France	40,000	31,500	44,500	39,500	47,500	41,000
Germany	18,700	17,700	17,200	17,270	15,935	18,000
Greece	750	650	750	750	750	750
Holland	700	550	750	600	650	600
Italy	24,000	19,200	23,800	21,000	24,600	23,000
Portugal	1,000	800	700	400	400	800
Roumania	11,500	13,400	6,900	6,700	5,350	13,600
Russia	67,000	102,800	97,600	71,000	63,675	63,300
Servia	1,750	1,650	1,800	1,750	1,400	1,850
Spain	19,500	17,200	17,200	14,500	12,700	17,500
Sweden	1,000	900	800	720	725	750
Switzerland	500	350	550	500	500	500
United Kingdom	8,000	6,500	7,900	6,750	7,250	7,580
Total for Europe	236,200	252,300	248,800	218,500	211,535	229,730
	1911.	1910.	1909.	1908.	1907.	1906.
Algeria and Tunis	5,500	5,700	5,100	4,100	5,140	5,500
Argentine Republic	21,000	17,500	16,500	20,150	24,500	19,100
Australasia	10,500	13,100	12,400	9,500	6,000	10,000
Canada	24,000	18,700	21,000	14,000	10,500	15,400
Chili	2,000	2,300	2,300	2,175	1,800	1,750
Egypt	4,700	4,000	3,900	2,250	1,500	1,500
India	46,300	44,600	35,370	26,750	39,700	40,000
U.S. America	78,000	79,400	88,000	80,000	76,000	88,000
Uruguay	1,200	1,300	1,250	1,000	1,000	800
Japan	2,800	2,700	2,800	2,900	2,800	2,475
Total out of Europe	195,800	189,300	188,620	162,825	168,940	184,525
Grand Total	432,000	441,600	437,420	381,325	380,475	414,355

THE WORLD'S VISIBLE WHEAT SUPPLY ON JANUARY 1ST.

	European. Qrs.	U.S. Canada. Qrs.	Total. Qrs.	Eng. Average Price. s. d.
1912	9,480,000	14,090,000	23,570,000	33 0
1911	12,345,000	9,830,000	22,175,000	30 5
1910	7,980,000	7,400,000	15,380,000	33 3
1909	5,955,000	10,750,000	16,705,000	32 0
1908	7,410,000	8,500,000	15,910,000	34 6
1907	8,480,000	10,260,000	18,740,000	26 0

Date.		LONDON (Previous Day).		ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
		Per Bushel.	Per Bushel.			
Jan. 6	Firm, further advance, Nov.-Dec., 4/7½d.; Liverpool firm, Dec.-Jan., 4/0½d.	..	3/7½d to 3/8	3/7½	3/8	3/7½
8	Steadily held, not active; afloat, 4/0½d.	..	Do.	3/8	3/8	3/8
9	Firm, but quiet	..	3/7 to 3/8	Do.	3/7½ to 3/8	Do.
10	—	..	3/7 to 3/7½	3/7½ to 3/8	Do.	Do.
11	Quiet, easier tendency; Liverpool, Jan.-Feb., 4/0½d.	..	Do.	3/7½	3/7½	3/7½
12	Steady, but quiet	..	3/7 to 3/7½	3/7 to 3/7½	3/7 to 3/7½	3/7 to 3/7½
13	Very dull; Liverpool, steady but quiet	..	Do.	Do.	Do.	Do.
15	—	..	Do.	Do.	Do.	Do.
16	Quiet, easier tendency; Sept.-Oct., 4/7½	..	3/6½ to 3/7	3/7	3/7	3/7
17	Steady, but quiet; Dec.-Jan., 4/7½	..	3/7 to 3/7½	Do.	Do.	Do.
18	Firm, sellers asking advance, to arrive, 4/7½; Liverpool firm, Jan.-Feb., 4/7½	..	Do.	3/7 to 3/7½	3/7 to 3/7½	3/7 to 3/7½
19	Strong, good demand, Jan.-Feb., 4/7½; Liverpool very firm	..	3/6½ to 3/7½	Do.	Do.	Do.
20	Firm, Jan.-Feb., 4/8½; Liverpool firm	..	3/7 to 3/8	3/7½ to 3/7½	3/7½ to 3/7½	3/7½ to 3/7½
22	—	..	Do.	3/8	3/8½	3/8½
23	Firm, quiet, off coast, 4/7½; Liverpool firmly held	..	Do.	..	Do.	Do.
24	Quiet, easier tendency	..	Do.	..	Do.	Do.
25	Quiet, easier tendency; Liverpool quiet	..	Do.	..	Do.	Do.
26	Quiet	..	3/6½ to 3/7½	3/8	3/8	3/8
27	Quiet; Liverpool dull, easier tendency	..	Do.	Do.	Do.	Do.
29	—	..	Do.	Do.	Do.	Do.
30	Firm, held for 3d. advance, Jan.-Feb., 4/8; Liverpool firm, 3d. to 6d. dearer	..	3/7½ to 3/8	3/8½	3/8½	3/8½
31	Steady but quiet; Liverpool steady, but not active	..	3/7 to 3/8	Do.	Do.	Do.
Feb. 1	Very slow, rather lower; Nov.-Dec., 4/8½ and 4/8	..	Do.	Do.	Do.	Do.
2	Rather easier; Liverpool dull; Jan.-Feb., 4/8	..	Do.	Do.	Do.	Do.
3	Firmer; Feb.-Mar., 4/8½; Liverpool firmer	..	Do.	Do.	Do.	Do.
5	—	..	3/7½ to 3/8½	3/8½	3/8½	3/8½ to 3/8½

STEAMER FREIGHTS.—Steamers from South Australia to United Kingdom-Continent, full cargo rates 30s. to 32s. 6d. per ton (9½d. to 10½d. per bush.), according to position. Parcels, Port Adelaide to London-Liverpool, 30s. per ton (9½d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SUGAR FREIGHTS.—From South Australia to United Kingdom-Continent, 30s. to 31s. 3d. per ton (9½d. to 10½d. per bush.), early loading, 27s. 6d. per ton (8½d. per bush.) backward; to South Africa, 25s. to 26s. 3d. per ton (8d. per bush.).

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on February 1st—
BUTTER.

Owing to the mildness of the season during January there has been a good supply of cream. The demand has been very good and the usual high standard of quality has been maintained. The prices at present are—Superfine 1s. 4d. and pure creamery 1s. 3d. per pound.

A. W. Sandford & Co., Limited, report on February 1st—

BUTTER.—Comparatively cool weather prevailed during the earlier weeks of the month of January, which enabled dairymen to make and market their butter, and also cream, generally in good order. Towards the end of the month, however, a heat wave set in, which materially affected the keeping properties of the product; but it is pleasing to report that for all quality lots a strong market ruled at firming rates. Best factory and creamery, fresh in prints, was quitted at 1s. 2½d. to 1s. 4d. per pound; choice separators and dairies, 1s. 1½d. to 1s. 2½d.; medium quality lots, 10d. to 11d.; stores and collectors, 9½d. to 10½d.

EGGS.—As usual, immediately following the Christmas holidays values eased, but later on a recovery was effected under the influence of much stronger demand, and the market closed at 9d. per dozen for prime guaranteed new laid, full-sized hen; duck realised 9½d.

CHEESE.—South Australian factories have experienced a brisk month's trade, the volume of business this season far exceeding that of the previous year. Prices are also keeping up, the range being from 6½d. to 7½d. per pound for large to loaf.

BACON.—Following the rush for Christmas orders, values have not been as firm, but a fairly substantial turnover has been effected in established brands of factory sides, middles, and rolls. Best factory-cured sides, 6½d. to 7½d. per pound; middles, 7d. to 8d.

HAMS.—In calicoes, from 9d. to 10d. per pound.

HONEY.—Strong market ruled. The new season's take is now coming forward, but unfortunately the yield promises to be a light one, whilst present supplies are scarcely equal to trade requirements. Prime clear extracted is selling at 3d. to 3½d. per pound; beeswax, 1s. 3d.

ALMONDS.—Only a few odd lots offering, and buyers are waiting for the new crop to come along. Brandis, 6d.; mixed soft shells, 5d.; kernels, 1s. 2½d.

LIVE POULTRY.—The peculiar feature in this line is the fact that a strong demand continues for all coops of quality birds, these selling at full rates; but for light or weedy sorts it takes considerable pushing to effect quittances at reduced rates. Prime table roosters fetched from 3s. to 3s. 6d. each; plump cockerels, 2s. to 2s. 6d.; hens, 1s. 8d. to 2s. 3d.; ducks, 1s. 8d. to 2s. 3d.; geese, 3s. to 3s. 6d.; pigeons, 7½d.; turkeys, from 7d. to 10d. per pound, live weight, for fair to good table sorts.

POTATOES.—The output from the plains near Adelaide was considerably heavier than expected, and as these came along freely values receded. Meanwhile Gambiers have been doing some of the country trade, whilst the Warrnambool district has also been offering at a comparatively low figure. Present quotations—New locals, from £6 to £7 per ton, Adelaide; Gambiers, £4 15s. on trucks, Gambier.

ONIONS.—Supplies were scarcely equal to trade requirements during the earlier weeks of the month, but since then a considerable increase in the quantities marketed by local growers was experienced. Quotations range from £9 to £10 per ton, Adelaide.

RAINFALL TABLE.

The following table shows the rainfall for January, 1912, at the undermentioned stations, also the average rainfall for January and the rainfall for January, 1911, respectively:—

Station.	For Jan., 1912.	Average for Jan.	For Jan., 1911.	Station.	For Jan., 1912.	Average for Jan.	For Jan., 1911.
Adelaide	0-21	0-85	0-17	Hamley Bridge	0-18	0-97	0-20
Hawker	—	0-58	0-16	Kapunda	0-10	0-91	0-23
Craddock	—	0-65	0-68	Freeling	0-06	0-93	0-10
Wilson	—	0-71	0-08	Stockwell	0-04	0-84	0-25
Gordon	—	0-29	1-07	Nuriootpa	0-07	0-89	0-27
Quorn	—	0-65	0-32	Angaston	0-03	0-84	0-25
Port Augusta	—	0-55	0-27	Tanunda	0-10	0-91	0-56
Port Germein	0-02	0-73	0-31	Lyndoch	—	0-91	0-07
Port Pirie	—	0-83	0-18	Mallala	0-17	0-98	0-10
Crystal Brook	0-19	0-70	0-02	Roseworthy	0-25	0-87	0-02
Port Broughton	0-13*	0-27	1-65	Gawler	0-17	0-79	0-05
Bute	—	0-83	0-22	Smithfield	0-09	0-77	0-07
Hammond	0-03*	0-70	—	Two Wells	—	0-90	0-03
Bruce	—	0-27	0-32	Virginia	0-10	0-91	0-06
Wilmington	0-05	0-83	2-82	Salisbury	0-21	0-85	0-03
Melrose	0-03	1-33	2-56	Teatree Gully	0-30	1-14	0-12
Booderoo Centre	0-14	0-90	0-02	Magill	0-34	1-04	0-38
Wirrabara	0-08	0-68	0-02	Mitcham	0-09	1-01	0-15
Appila	0-06	0-67	0-11	Crafrers	0-38	1-79	0-65
Laura	0-16	0-71	0-10	Clarendon	0-16	1-31	0-33
Caltowie	0-17	0-70	—	Morphett Vale	0-14	1-06	0-19
Jamestown	0-20	0-69	0-09	Noarlunga	0-02	0-76	0-04
Gladstone	—	0-66	1-02	Willunga	0-07	0-86	0-03
Georgetown	0-41	0-71	0-05	Aldinga	0-03	0-77	0-19
Narriby	0-26	0-66	0-02	Normanville	0-04	0-67	0-02
Redhill	0-12	0-60	0-02	Yankalilla	0-04	0-71	0-05
Koolunga	0-12	0-69	0-03	Eudunda	0-09	0-88	0-41
Carrieton	0-09	0-74	0-03	Sutherlands	0-01	—	0-15
Eurelia	0-08	0-74	—	Truro	0-06	0-82	0-23
Johnsburg	—	0-52	—	Palmer	0-08	—	0-34
Orroroo	0-08	1-13	—	Mount Pleasant	0-14	0-89	0-24
Black Rock	0-01	0-71	—	Blumberg	0-12	1-37	0-33
Petersburg	0-06	0-89	0-04	Gumeracha	0-22	1-18	0-36
Yongala	0-11	0-69	0-02	Lobethal	0-17	1-22	0-34
Terowie	0-08	0-74	0-34	Woodside	0-22	1-18	0-24
Yarcowie	—	0-61	0-34	Hahndorf	0-20	1-26	0-38
Hallett	0-12	0-80	0-46	Nairne	0-15	1-20	0-51
Mount Bryan	0-12	0-34	0-67	Mount Barker	0-15	1-12	0-52
Burra	0-14	0-80	0-93	Echunga	0-14	1-28	0-40
Snowtown	—	0-76	0-06	Macclesfield	0-06	1-12	0-56
Brinkworth	—	0-47	0-06	Meadows	0-04	1-35	0-27
Blyth	0-06	0-79	—	Strathalbyn	0-07	0-79	0-18
Clare	0-14	0-97	0-18	Callington	0-02	0-93	0-43
Mintaro Central	0-12	0-65	0-55	Langhorne's Bridge	0-10	0-59	0-21
Watervale	0-18	1-03	0-26	Milang	0-08	0-84	0-13
Auburn	0-12	1-12	0-23	Walleroo	0-06	0-64	0-04
Manoora	0-19	0-63	0-11	Kadina	0-02	0-61	0-03
Hoyleton	0-03	0-94	0-10	Moonta	—	0-60	0-80
Balaklava	—	0-86	0-02	Green's Plains	0-02	0-67	0-04
Port Wakefield	0-02	0-65	0-38	Maitland	0-03	0-68	0-86
Saddleworth	0-13	0-86	0-15	Ardrossan	0-03	0-61	0-26
Marrabel	0-11	0-86	0-18	Port Victoria	0-03	0-53	0-59
Riverton	0-17	0-80	0-29	Curramulka	—	0-78	0-01
Tarlee	0-19	0-89	0-09	Minlaton	—	0-58	—
Stockport	0-10	0-96	0-17	Stansbury	0-05	0-75	0-12

RAINFALL TABLE—*continued.*

Station.	For Jan., 1912.	Average for Jan.	For Jan. 1911.	Station.	For Jan., 1912.	Average for Jan.	For Jan. 1911.
Warooka	—	0.51	0.10	Bordertown	0.07	0.94	0.18
Yorke town	—	0.59	0.02	Wolseley	0.05	0.75	0.15
Edithburgh	0.06	0.58	—	Frances	0.04	0.91	0.12
Fowler's Bay	—	0.49	0.21	Naracoorte	0.08	0.92	0.48
Streaky Bay	—	0.54	—	Lucindale	0.05	0.89	0.08
Port Elliston	—	0.47	—	Penola	0.11	1.18	0.63
Port Lincoln	0.02	0.69	0.05	Millicent	0.02	1.14	—
Cowell	—	0.51	0.23	Mount Gambier ...	0.07	1.58	0.20
Queenscliffe	—	0.52	—	Wellington	0.08	0.98	0.46
Port Elliot	0.09	0.78	0.07	Murray Bridge.....	0.09	0.81	0.17
Goolwa	0.19	0.74	0.22	Mannum	0.01	0.55	0.14
Meningie	0.03	0.75	0.41	Morgan	—	0.57	0.06
Kingston.....	0.08	0.87	—	Overland Corner ...	0.02	0.59	1.01
Robe	0.10	0.88	—	Renmark	0.13	0.53	0.77
Beachport.....	0.05	1.13	—	Lameroo	0.01	—	0.83
Coonalpyn	0.03	0.86	0.24				

TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of 3,500 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch	Report on Page	Dates of Meetings.	
		Feb.	March			Feb.	March
Amyton	*	—	—	Millicent	775	13	12
Angaston	*	3	2	Miltalie	*	3	2
Appila-Yarrowie	*	—	—	Minlaton	*	10	9
Arden Vale & Wyaca	*	—	—	Mitchell	*	3	2
Arthurlton	*	—	—	Monarto South	*	—	—
Balaklava	*	—	—	Monteith	†	—	—
Beetaloo Valley	769	—	—	Moonta	*	—	—
Belalie North	*	3	2	Moorlands	771	—	—
Blyth	769	13	26	Morchard	767	—	—
Howhill	*	—	—	Morgan	771	3	2
Bowmans	*	29	28	Morphett Vale	774	—	—
Bute	*	—	—	Mount Barker	†	29	28
Butler	*	—	—	Mount Bryan	*	—	2
Caltowie	*	—	2	Mount Bryan East	*	3	2
Carrieton	29	29	29	Mount Gambier	776	—	—
Cherry Gardens	772	27	26	Mount Pleasant	*	9	8
Clare	*	—	1	Mount Remarkable	767	23	27
Clarendon	772	26	—	Mundoora	*	—	—
Colton	*	3	2	Nantawarra	*	28	27
Coomooroo	765	2	2	Naracoorte	*	10	9
Coonalpyn	*	—	—	Narriby	*	—	—
Coorabie	770	2	3	Narrung	†	—	—
Cradoek	*	—	—	Northfield	*	27	—
Crystal Brook	*	—	—	Parrakie	†	3	28
Cummins	*	3	2	Paskeville	*	29	2
Davenport	766	—	—	Penola	778-80	3	30
Dawson	*	—	—	Penong	771	10	9
Dingabledinga	773	9	8	Petina	*	—	—
Dowlingville	*	—	—	Pine Forest	*	27	—
Elbow Hill	*	—	—	Port Broughton	*	2	1
Forest Range	*	29	28	Port Elliot	*	17	16
Forster	*	—	—	Port Germein	*	—	—
Frances	*	2	1	Port Pirie	*	3	2
Freeling	770	—	—	Quorn	*	—	2
Gawler River	*	—	—	Redhill	*	27	26
Georgetown	*	3	2	Renmark	*	—	—
Geranium	*	28	30	Riverton	*	—	—
Green Patch	*	26	—	Saddleworth	*	16	15
Gumeracha	*	26	—	Salisbury	*	6	5
Hartley	773	3	2	Shannon	*	—	—
Hawker	*	5	4	Sherlock	*	—	—
Hookina	766	3	2	Stockport	*	—	—
Ironbank	†	2	1	Strathalbyn	*	26	—
Kadina	*	10	—	Sutherlands	*	—	—
Kalangadoo	774	—	9	Tatiana	*	3	2
Kanmantoo	773	3	2	Uraidla and Summert'n	*	5	4
Keith	775	6	2	Utera Plains	*	3	2
Kingscote	*	24	5	Waikerie	*	—	—
Kingston	†	—	30	Wareowie	*	—	—
Koppio	*	29	—	Watervale	*	—	—
Kybybolite	*	—	28	Wepowie	*	—	—
Lameroo	*	—	—	Whyte-Yarrowie	*	—	—
Leighton	*	—	—	Willawatt	*	—	30
Lipson	*	23	—	Willowie	*	23	22
Longwood	*	—	27	Willunga	*	3	2
Lumdale	*	—	—	Wilmington	769	28	—
Lyndoch	*	—	—	Wirrabara	*	—	—
MacGillivray	774	—	—	Wirrega	780	—	—
Maitland	*	1	7	Woodside	*	—	—
Mallala	*	5	4	Yadnarie	*	3	2
Mannum	*	24	30	Yallunda	*	—	—
Meadows	†	—	—	Yongala Vale	*	3	5
Meningie	*	3	2	Yorketown	*	10	9

* No report received during the month of January. † Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by GEORGE G. NICHOLLS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Coomooroo, December 19.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. E. Berriman (chair), H. Avery, E. Brice, E. Hall, J. Brown, W. and M. Robertson, and E. C. Brice (Hon. Sec.).

HARVESTING MACHINERY.—In a discussion on this subject the view was expressed that harvesters pulled straighter behind the horses than did strippers. With the former the bulk of the weight was on the near side as the box filled. The lighter draught of the harvester was attributed to the fact that it generally had a wider tire on the nearside wheel.

SMUT.—Mr. Avery pointed out that wheat sown on summer fallow was more badly affected with smut than that sown on winter fallow, although the weather and other conditions at time of sowing were similar. Mr. Berriman stated that although all his seed had been pickled, and was free from smut, his crop was slightly affected with it. He thought drills and super. had something to do with the trouble.

Coomooroo, January 6.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. E. Berriman (chair), W. and M. Robertson, E. H. Hall, and E. C. Brice (Hon. Sec.).

DESTRUCTION OF RABBITS.—The following paper was read by Mr. E. H. Hall:—“I have tried the following methods of destroying rabbits with more or less success, viz., Finlayson & Cousen's compound, strychnine and raspberry jam, strychnine and sandalwood twigs, and S.A.P. and pollard. With Finlayson & Cousen's compound I have been very successful, and not many of the burrows were opened from the inside, but the travelling rabbits opened them from the outside. This makes it necessary to go over the same ground again, which is expensive. Strychnine and sandalwood twigs are readily eaten by the rabbits, but there is the possibility of stock eating the twigs. S.A.P. and pollard I consider dangerous, as the phosphorus in the S.A.P. has a tendency to ignite and cause grass fires when exposed to the sun. I have also had a number of sheep poisoned by picking up the baits. It is good for killing rabbits, but for the reasons stated it is better left alone. The best and safest method is strychnine and raspberry jam. To mix this place a large teaspoonful of soluble strychnine into half a tin of jam; then three-quarters fill the tin with sugar and stir this well so that the sugar and strychnine dissolve. The sugar takes off the bitter taste from the strychnine, and the rabbits will eat it more readily. Small furrows should be made about the burrows with a garden hoe, in which small flat stones should be placed from 2ft. to 3ft. apart. On each stone a small piece of jam should be placed. Stock will not touch this, and it is better than the S.A.P. The most suitable time for killing rabbits is when the feed and water are scarce.” In the discussion which followed the reading of the paper, Mr. Robertson said he had spent considerable time last winter digging out burrows, but the results were good. It was necessary to go over the ground several times in case any passages were missed. He had noticed when a burrow had been dug out the rabbits left it, but afterwards came back in pairs. Mr. Brice had used S.A.P. and strychnine mixed with pollard with success, so far as the destruction of the rabbits was concerned; but he had lost a lot of valuable stock through their picking up the baits. He had also been successful with bisulphide of carbon. When this method was being adopted, he preferred to damp a piece of wool and place this in the holes, rather than use the pump. In the summer months the ground was too porous for this method to be successfully carried out. It was a good plan to fence in waterholes at this time of the year. When Mr. Berriman first came to the district there were only one or two burrows on his land. He promptly dug these out, with the result that he had experienced little trouble with the pests since. He advised fencing in burrows and laying poison inside the fences.

Davenport, December 15.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Roberts (chair), Gosden, Rice, Sanderson, and Lecky (Hon. Sec.).**QUESTIONS FROM CONGRESS FOR OPINION.**

Selling Cattle by Live Weight.—The proposal to substitute the system of selling cattle by live weight for that at present in operation was duly discussed, with the result that the Branch decided to support the change.

PHOSPHORISED POLLARD AND DRY BIBLE.—The following paper was contributed by Mr. Sanderson :—"There is not the slightest doubt that the poison cart has proved a great boon to the squatter and grazier. It is really the only weapon they can use with any success to exterminate the rabbit, and wherever the poison cart has been used thousands and thousands of rabbits have fallen victims to the dainty little pellets of phosphorised pollard which are dropped so systematically into the furrows made as the cart proceeds. I would strongly advise the squatter and grazier to continue using the poison cart—use it as often as they can—as it is the only effective means they have of keeping the pest under. Their country is altogether too large to adopt fumigation, which can only be successful where holdings are rabbit-proof, and this is more practicable in the case of the small landholder. Although I urge the squatter and grazier to use the poison cart, I would strongly advise the dairy-farmer to leave it alone. In justification of this advice I may say that some two and a half or three years ago I read that some of the dairy-farmers at Hammond and Carrieton had lost several valuable milking cows. In describing the cause the correspondent stated that the cows seemed in the best of health and in splendid condition, say, in the morning, and a few hours later they were down, and after suffering awful agony they died in a very short time. A *post-mortem* examination was held on each cow, and the cause of death was said to be dry bible. We ask what is dry bible? and are told that it is a disease which usually affects cows, and is really found in the third stomach. The walls of this stomach appear to rot and present altogether a withered up, dry appearance. The cause of dry bible, in my opinion, is nothing more nor less than phosphorised pollard. When the rabbits devour these pellets of pollard which are dropped by the poison cart only a short time elapses before they succumb, the phosphorus taking effect very quickly. Consequently they die before they reach their warrens and their carcasses may be seen lying all over the place. Crows and hawks are very partial to bunny, and they set to work and strip the flesh off the carcass, leaving the stomach and intestines, as for some reason of their own they do not include the latter in their menu. In the course of a week or two the stomach and intestines become dry and hard, and the cow, being a great scavenger, will eat this readily, no matter how well fed she may be. During a day she might consume several of these dried up internal organs of the rabbit. Some of the phosphorus still remains encased in the stomach and intestines of the rabbit, and when eaten by the cow there is perhaps sufficient poison to cause the animal's death. Apparently there are no visible effects during the time the poison is conveyed to and from the first and second stomach, due perhaps to the mild action of the gastric juices in these particular stomachs; but it is when it enters the third stomach, which is the final stage of digestion, that the cow is seized with violent pains, and in a very little while, despite all efforts to save her, she dies. I am of opinion that the dry and withered condition of the third stomach, which is described as dry bible, is caused by the phosphorus resisting digestion and eventually burning the walls of the stomach or bible. Of course, this is only theory, and I do not wish to appear dogmatical, neither do I pit myself against the knowledge of such experienced men as our worthy stock inspectors; but the next time a dairyman's cow succumbs to the disease known as dry bible the animal should be opened and the contents, if not the whole of the third stomach, be sent down to the city for analysis, and if any trace of phosphorus at all is found, then I consider there is something in my theory; if not, then there must be some other agent responsible, and the analysis will no doubt assist in revealing what it is. This subject might be worth considering by some of the dairy-farmers, who, perhaps, would never dream that the poison cart has a connection with the fatal disease known as dry bible." In the discussion which followed members expressed the opinion that the writer had made out a good case for investigation.

Hookina, January 6.

PRESENT.—Messrs. S. Stone (chair), P. and T. Kelly, J. J. and A. Henschke, Madigan (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—The proposal to substitute the system of weighing wheat in bulk for that at present in vogue was discussed at length, with the result that the Branch decided to give the idea its support.

Morchard, January 6.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs Kitto, McDougall, Laskey, Tuop, Rafferty, Kirkland, and Scriven.
SHOWING HORSES.—Mr. H. Laskey dealt with this subject in a paper in which he said the first time a horse was shod the hind shoes should be put on before the fore shoes. They should fit well and not pinch the hoof, and where necessary the hoof should be cut to present a level surface for the shoe. Light horses should not be worked without shoes, as their feet broke away so easily. The farmer should make shoes himself rather than use the machine-made articles, with the majority of which the last nail hole was set too near the heel. When a horse was brushing the outside of the foot should not be touched, but the inside should be cut as low as possible. The inside of the hoof and shoe should be rasped as level as possible in order to obviate the danger of cutting the foot. Brushing shoes should not have more than two nails on the inside, and clips should be put on the toes and on the outside to prevent the shoe moving inwards. Horses that are inclined to stumble should be shod as light as possible, and should have their feet cut well out. The hind shoes of draughts should be cut short, as there was a danger of their being trodden on by other horses when turning sharply. Rusty nails should not be used for nailing on shoes. Members generally commented favorably on the views expressed in the paper.

PETROL ENGINES ON THE FARM.—This subject was dealt with in a paper by Mr. R. Kitto, in which he pointed out the necessity of the farmer bestowing care on his machinery. If dust accumulated in some parts of the engine considerable trouble was experienced. The trembler blade, which consisted of two platinum points, and which connected the battery with the coil, needed specially to be kept clean, and this could be best done by running a piece of clean cloth between the points prior to starting the engine. Should these parts become worn they could be sharpened by filing. When the petrol tank became dirty, trouble was experienced with the explosion. Lubrication should receive careful attention, and care should be exercised in seeing that with water-cooled engines the water was circulating properly; otherwise the cylinders would become overheated, foul, and cause the sparking plug points to clog. The points of the plug should be about ⅜ in. apart. These could be cleaned with a pocketknife. Engines should never be overloaded, and should not be taken to pieces except when necessary.

Mount Remarkable, January 3.

(Average annual rainfall, 21 in.)

PRESENT.—Messrs. Bauer (chair), J. McIntosh, L. George, G. H. Goddard, W. Oldland, N. S. Giles, T. H. Caseley, W. Foot, H. H. Davie (Hon. Sec.), and one visitor.

HOW TO IMPROVE THE AGRICULTURAL BUREAU.—The following paper was read by the Hon. Secretary:—"Our duty to-night is to centre our thoughts on our Branch of the Agricultural Bureau and its purposes, which are to assist the people on the land in their study of the conservation and application of energy: to assist the farmer to produce his particular commodity or commodities in a methodical and scientific manner; and to assist each person to rid his vegetation of parasites and his stock of disease. These are matters with which the populace about us is interested. Our Branch is here for the purpose of helping the people in the subjects in which they are interested by one of the best means, i.e., mutual interchange of ideas, so as to make individual knowledge into general and widespread information, modified or verified by friendly discussion. Our problem to-night consists in bringing together the interests of the people and the objects of the Bureau. Theoretically it should be an easy enough task; but practically people are not easily persuaded of the true value of co-operation and of scientifically tabulated results of experiments. What is the reason? To me it seems that the chief difficulties are—1. To convince a man that his humble individual experiment, and perhaps his failure, is worth everything to other people for the lessons it conveys. 2. To get busy men to take the time to make records of their work—tabulated statements of the measure of success achieved on the farm, in the garden, or in the stockyard. 3. To persist in making records for

lengthened periods so as to be able to institute comparisons with regard to climate and other conditions. 4. (And these cases are very few). The secretive tendency in some leading them to keep a good thing to themselves for the advantage it gives them from a commercial point of view; and 5, the innate dislike some have to get out of a groove. 'I don't want to hear of new-fangled ways; that which was good enough for my forebears is good enough for me,' we think we hear them say. It is an analagous case to that of the old peasant in England who was carrying his grist to the mill. He sat astride the old grey mare with the bag in front of him, the grist at one end and a huge stone in the other end to preserve the balance. Some enterprising acquaintance meeting him and learning the nature of his load inquired, 'Why don't 'ee throw away the stone and shake half t' grain to the other end of the bag; balance 'tself then?' 'Well, to think I never thought o't afore. Howsomever, my father d'd this way afore me, and his father afore him,' returned the peasant. We can easily apply the moral. But if every one had thought along these lines the experiments which led to the use of artificial manures would not have been carried out. The chemist could not have succeeded without the help of the practical agriculturist. Because the spirit of enterprise was fostered the children who were taught to study nature discovered the nature of a hitherto unknown poisonous weed and saved the lives of a thousand or two thousand pounds worth of stock in a district of Victoria. It is our work to-night to find a way to mend weak places in our economic situation. How can we create more interest in our meetings? First—Let us introduce the social element. Let us have a social evening to commence and to end the year. Let us have songs, recitations, and stories bearing upon agriculture, with the indispensable supper, &c. Second—At one of our meetings where a good number of visitors is present by invitation collect questions from the audience, and encourage each male at least to come forward and speak not less than one sentence or more than for five minutes upon one out of three subjects, returning the other two papers to the box without divulging the nature of the subjects mentioned upon them. Some will say that this encroaches upon literary society work. What if it assumes the nature of literary society work? We must correlate the subjects of everyday life, and let each in turn be the handmaid and concomitant of the other. In a small community, where the same group of people has to assume leadership in all local concerns, and there is not time to have a separate literary society, some of its work where appropriate could be linked up with the Bureau work, just so long as the aims of the Bureau were kept to the front. Third—Let members talk about Bureau affairs before the general public, and work hard to get visitors to attend the meetings with them. Many of the visitors will be possible members. Fourth—Let each member think no idea or experiment of his too insignificant to bring before the other members. Let him tell even of his failures. These are often better preceptors than successes. Fifth—Keep in the foreground the necessity for procuring seeds, plants, material, and apparatus for experiment. Sixth—Often our greetings in the street are followed by wearisome platitudes about the weather, when there is some question we are burning to ask or some information we are anxious to secure if only we could recall the matter at the moment of contact with our fellow. Seventh—Each member should consider it his duty to select some production for his study and report at each meeting. Eighth—Meetings of members at farms or workshops for the purpose of seeing some experiment or process, or some invention bearing upon our work should be encouraged. Ninth—Free and vigorous discussion is wanted in the meetings, and so long as the argument is friendly and kindly the crisper and more searching it is the better. A well-fitted line of experiment or argument, like a well-fitted machine, does not suffer by being dismembered and having its component parts critically examined. Tenth—The most important factor in arousing and maintaining interest is the regular periodical record of experiments, so that the oft-repeated happening can be accepted as positive proof. The records must be persistent and continued from year to year for the purpose of making comparisons under varying climatic conditions. Eleventh—Beside the calendar arranged for the coming operations one might be constructed on progress reports from meeting to meeting. Twelfth—The Branch should enter enthusiastically into movements of local interest. Here we should throw all our weight on the side of those who are striving to show the need for carrying out a water conservation scheme which, for the expenditure of a few thousand pounds, would provide irrigation over 200 square miles of the plateau right out to Booleroo, Willowie, Pinda, and Hammond, making the district a veritable garden of Eden, and converting each blockholder even into a flourishing dairy-farmer. Thirteenth—We could have upon the walls of our meeting room a neat case with a glass front containing specimens depicting the results of experiments accompanying carefully tabulated records for the public to see what a help the Bureau is to them in their daily toil. I trust that the few suggestions I have set down may at least be the means of setting up a current

of thought in some abler minds, which current pursued to its legitimate issue may provide weighty results in regards to interest in our Bureau work." In the discussion which followed the reading of the paper members generally indorsed the remarks made by the writer, especially in regard to the necessity of keeping careful records of experiments.

Wilmington, January 3.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. J. Hannagan (chair), W. G. and J. Schuppan, Litchfield, Hoskins, George, Zimmermann, Noll, Jacobs, Robertson, and Jericho (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—After a lengthy discussion on the proposal to substitute the system of weighing wheat in bulk for that at present in vogue, it was decided that the present system was the more advantageous and less costly. The Branch would not give the proposal its support.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, October 6.

PRESENT.—Messrs. A. Jacobie (chair), Bartrum, Curtin, Burton, Thyer, Hamilton, Woolford, S. and C. Cox, Bartrum (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Due consideration was given the proposal to institute the system of selling cattle by live weight, but it was thought that the result was not likely to be a success, and therefore the Branch decided not to support the change.

Farm Laborers' Blocks.—The suggestion to survey small holdings for farm laborers in new hundreds was duly discussed. The Branch did not view the idea with favor.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Blyth, January 9.

PRESENT.—Messrs. T. Dunstan (chair), Buzacott, Gill, Schulze, Pratt, Nannes, Williams, Roberts, H. W. and W. O. Eime (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Farm Laborers' Blocks.—Considerable discussion took place with reference to the proposal to survey small blocks for farm laborers in new hundreds. It was agreed that it would be a good plan to provide small blocks close into the towns, but not out amongst the farmers.

Selling Cattle by Live Weight.—The majority of members approved the proposal to institute the system of selling cattle by live weight.

Weighing Wheat in Bulk.—The suggested substitution of the system of weighing wheat in bulk for that already in vogue was duly considered. Members thought a saving of time and labor would be effected, and more general satisfaction would be secured by the adoption of the proposal.

Freeling, January 5.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. F. H. Heinrichs (chair), Harvey, A. Mattiske, sen., Neldner, Elix, Neindorf, Koch, Morris, Shanahan, Block (Hon. Sec.), and two visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—The proposal to introduce the system of weighing wheat in bulk was discussed at length. Mr. Heinrich thought the change would be to the benefit of the farmer. Where the weighbridges were placed in the open, however, the wind would exercise considerable influence on them. Mr. Mattiske said the proposed system had proved satisfactory in New South Wales. Mr. Elix pointed out that he had had a load of wheat weighed on the weighbridge, and then bag by bag over the scales. The former weighing resulted in a slight difference in his favor. It was agreed that the change would be beneficial in the case of the larger wheat-growing centres, but was not necessary in the smaller districts.

WESTERN DISTRICT.**Coorabie, December 9.**

PRESENT.—Messrs. Giles (chair), Roberts, Underwood, Hobbs, Riddle, Wheadon, Atkin (Hon. Sec.), and eight visitors.

PREPARATION OF LAND FOR SEEDING.—Mr. Wheadon dealt with this subject in a short paper, in which he said he would start drilling in a late variety of wheat at the rate of ½ bush to the acre if sufficient rain had not fallen by the 20th of April. With new mallee land he would plough the first year, as this had the effect of breaking the shoots. Land on which there was a good crop of rubbish he would leave until after rain, when he would go over it with the plough or cultivator. Sowing should be done during May or June. By running the skim plough or the disc over fallow land a good seed bed was secured. If the seed was put in too early there was a tendency for it to malt; consequently it was advisable to wait until after the rains had fallen.

Coorabie, January 6.

PRESENT.—Messrs. C. T. Giles (chair), D. Riddle, A. Hardy, E. Attie, W. Cousins, N. Roberts, C. and H. Hobbs, F. Underwood, C. B. Atkins (Hon. Sec.), and two visitors.

IMPLEMENTS AND MACHINERY FOR THE FARM.—The following paper was read by Mr. A. Hardy:—"In submitting this paper to the members of the Bureau I wish it distinctly understood that I have absolutely no interest in the sale of any machinery that I may recommend. In so far as seeding is concerned, as soon as possible after the scrub is burnt and picked up it is advisable to cultivate the land to a depth of about 2 in. with a disc cultivator. Do not use the stump-jump plough. For this purpose the 'Success' cultivator is the best implement I have seen in the market, as it has no parts which are likely to get out of order, and is very strong. The disc cultivator is lighter and quicker to work than the stump-jump plough, as four horses with a cultivator will cover a greater acreage per day than six horses with a nine-furrow plough. It does not cultivate the land too deeply, and so bring to the top a lot of sour soil. It does not pull up any stumps which have to be carted off before it can be drilled, when we are too busy to do unnecessary work; nor does it give the horses sore shoulders as the ploughing does, as there is no sudden stop or jar as with a plough hooking into a stump. It will allow more rubbish, such as fibrous roots, small sticks, leaves, and straw to pass through than the plough. With the heavy stump-jump plough the weight alone sinks it deep in the loose scrub land, and this stirs it up so much that when drilling it is a difficult matter to keep the seed from going too deep. About the third year I would advise the use of the stump-jump plough, as by that time the soil has become firmer, and it is desirable to cultivate to a greater depth. For this purpose I should recommend a 'Shearer' implement. It is a matter of opinion as to which is the best drill to use, as most of the different makes have good points. One of the lightest running drills is the 'Ontario', but it does not cultivate as well as most of the others; but if the land is well cultivated before and is not too wet this does not matter. In stripping the crop the main consideration is the

draught, and therefore the lightest-running machine is the best; therefore I have no hesitation in advising the use of the 'Mellor bike stripper' before all others. But now the labor question is so serious to any farmer who has to employ cleaners and has suitable land—and there is some on nearly every farm—I would recommend at least one harvester. I do not say that we will ever be able to do without the stripper, but the harvester is a great labor saver. My experience with the harvester is that two teams of four horses each will take off 40 bags of wheat per average reaping day in a crop yielding from 10bush. to 12bush., and make a good sample of the cleaning."

Penong, November 11.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. H. Grad (chair), G. Jones, G. E. Pearson, W. Sanders, P. C. Roberts, E. Wold, R. Kreig, J. Stiggants, G. H. and J. Oats (Hon. Sec.), and two visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Farm Laborers' Blocks.—It was thought that the proposal to survey small holdings for farm laborers in new hundreds would have the effect of settling labor in farming areas, where it was needed; consequently the Branch decided to support the idea.

A CRITICISM OF FARMING METHODS IN THIS DISTRICT.—The paper read by Mr. Luff, and printed in the October issue, page 321, was considered. Members expressed the view that, as the writer of the paper had not been in the district a sufficient time to enable him to competently criticise the methods in vogue, the paper should be dismissed without further discussion; which course was adopted.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Moorlands, January 5.

PRESENT.—Messrs. A. Maczkowiach (chair), H. Miatke, A. Miatke, L. Spurr, P. Neumann, C. S. Fead (Hon. Sec.), and one visitor.

ROLLING AND BURNING SCRUB.—In reply to a question, members expressed the view that for burning rolled scrub it was best to wait for a north wind, and in order to form a break to commence burning back against the wind at about 9 o'clock in the morning. At 11 o'clock the fire could be started. It was preferable to cultivate directly after the burning as this prevented the ashes being blown away.

MANURE FOR NEW LAND.—Members generally agreed that it was advisable to dress about 80lbs. of manure to the acre on new ground.

Morgan, December 30.

(Average annual rainfall, 9 in.)

PRESENT.—Messrs. R. Wohling (chair), B. French, E. Hausler, R. Wohling, jun., J. Hempel, J. Heppner, H. Wohling (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Due consideration was given the proposal to institute the system of selling cattle by live weight. Members thought that the method at present in operation was more satisfactory, and decided not to support the change.

Farm Laborers' Blocks.—The suggestion that small blocks in new hundreds should be surveyed for the purpose of providing holdings for farm laborers was duly considered. Members agreed that if a farmer required the services of a laborer for the whole of the year, he should allow the laborer a house and sufficient feed to enable him to keep a cow and horse. The laborer would then always be available, whereas if he were provided

with a holding in his own title, his time would be taken up on it just when his services were required by the farmer. The Branch decided not to support the idea.

LUCERNE.—A fine sample of lucerne was tabled by Mr. Heppner. It had been planted for four weeks, and had reached a height of 2ft. 6in.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, January 2.

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. S. Chapman (chair), H. T., and A. Jacobs, H., J., and C. Lewis, C. Ricks, A. R. Stone, J. Brumby, A. Broadbent, S. H. Curnow (Hon. Sec.), and one visitor.

WIRE NETTING FENCES.—Mr. Ricks, who initiated a discussion on this subject, pointed out the wholesale spread of vermin throughout the open and scrub country in the district. He contended that it was impossible for the landholder to successfully cope with rabbits hares, foxes, &c., unless his land was made absolutely vermin-proof; 5ft. wire netting made the most suitable fence. Mr. Chapman pointed out the difficulty of digging trenches for the netting in the rough scrub country, and unless the wire was well buried the vermin would burrow underneath. Mr. T. Jacobs considered that the success which had attended the efforts of those who had already netted their properties was largely due to the omission of others to do likewise. If all the landowners netted the pests would not have the scope of country over which to feed. Many thousands of rabbits would be enclosed in rough, scrubby country, which was most difficult to clear, on which there was little feed, with the result that they would be continually burrowing under the netting. Mr. H. Jacobs said the extreme roughness of some of the land was a bar to successful netting. The lin. mesh was the most suitable gauge to use.

Clarendon, January 8.

(Average annual rainfall, 33½in.)

PRESENT.—Messrs. E. A. Harper (chair), J. and L. Spencer, C. Mathews, A. and A. A. Harper, F. Shiedow, J. Piggott, T. B. Brooks, and A. Phelps (Hon. Sec.).

SELECTION OF SEED.—This subject was dealt with in a paper by Mr. J. Spencer, as follows:—"The man on the land too frequently takes things in general in a happy-go-lucky fashion, and does not stop to consider whether he is getting the best return for his outlay of labor and capital. This is not confined to one class of production, and as it is now harvest time with a large number of products it should not be difficult to ascertain which is giving the best returns. To produce a crop of hay the selection of seed is showing itself to be an essential. With wheat I procured last season from the southern district there is a great deterioration. This wheat was purchased as being White Tuscan, but when the crop matured it was found that about one-third of the crop was fully 6in. to 9in. higher, and of better growth than the remaining portion. I have since ascertained from the person who first grew this wheat in that locality, and from whom this wheat was first secured, that it had been sown and resown on the same farm for quite a number of years, and such indications as I had noticed in my crop had manifested themselves to him; and, to use his own words, the wheat is run out. The same applies to field peas and potatoes. I have grown side by side under similar conditions locally-grown peas and peas grown on limestone land. The return from the latter was more than double that from the former. So far as the time for sowing wheat for hay is concerned it may be interesting to note that on a 20-acre paddock six acres were sown in May after the first rain, the remaining portion about 10 days later. The result is that there is more hay on the first six acres than on any nine acres of the remaining portion of the paddock. It is necessary for the farmer to be in time with his sowing, and it is quite evident that more time can easily be spent in obtaining seed from reliable sources." In discussing the paper, members generally agreed in the view that in this district it was advisable to sow early and to change the seed frequently, although in wet seasons there was the risk of

the crop being dirty. In order to start the wild oats, Mr. Brooks suggested scarifying lightly after the crops were taken off. Others thought it preferable to scarify after the rains had fallen.

EXHIBITS.—Mr. A. A. Harper tabled a sample of peas which had been planted in September and which were well podded; two stalks of wheat, the heads of which were about 14in. in length; and a fair sample of potatoes which were grown from peelings.

PICKLING SEED WHEAT.—Mr. A. Harper reported that he had sown two small plots with pickled and unpickled seed respectively, with the result that the latter yielded the better return. In spite of the fact that pickling had a tendency to check the early growth of the wheat members advised pickling with $\frac{1}{2}$ lb. of bluestone to the bag. This would prevent smut attacking the crop.

Dingabledinga, January 16.

(Average annual rainfall, 30in.)

PARASITES.—Mr. F. DeCaux read a short paper on this subject, in which he said that from the pecuniary standpoint alone it was essential that stock on the farm should be kept as clean as possible. He pointed out that the United States of America was spending millions of dollars, with the idea of preventing the ravages of the tobacco pest. He urged members to do all in their power to rid their farms of pests and parasites, which were causing such a loss to the community.

Hartley, January 6.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. B. Wundersitz (chair), O. Wundersitz, Tydeman, Clark, Symonds, Richardson, Stanton, Brunes, Bermingham (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

• **Weighing Weight in Bulk.**—A lengthy discussion took place on the proposals to substitute the system of weighing wheat in bulk for that at present in operation, the result of which was that members unanimously agreed that the proposed alteration would be beneficial.

Kanmantoo, December 29.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. H. Shepherd (chair), R. Critchley, R. Downing, W. and L. Wooley, R. Talbot, A. Mills, W. Mills (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—The proposal to substitute the system of weighing wheat in bulk for that at present in vogue was duly considered. The Branch decided that if the weighbridges were under the control of some responsible public body, and a charge that would cover expenses was made, the change should result in some good, and they therefore decided to support it.

FARM HORSES.—Mr. R. G. Critchley contributed a short paper on this subject, in the course of which he referred to the diversity of opinion existing as to what constituted the best farm horse. Continuing, he said—"I have found that a good active draught horse with not too much hair on the legs, standing about 16 hands high, with a well-developed chest, a nice short back, well ribbed up, and with a good strong loin, a nice deep square rump, is the most suitable horse for farm work. He moves at a good pace no matter where you put him, and he has plenty of strength. I have often noticed farmers working six or eight horses consisting of heavy and medium draughts and the lighter sorts all in the one team. This is a mistake, as the horses do not work so evenly as when the team consists of the one class. The smaller and lighter horses are generally overworked. The necessity of breeding horses as sound as possible cannot be overlooked. Some people pay little heed to a horse's legs. This is a very important matter to my mind, for a horse with a good body must have the legs and feet to carry it. I would advise breeders when they are choosing stallions and mares to see that they are free from ringbone, sidebone, splints, calknees, and spavin hocks."

MacGillivray, January 2.

PRESENT.—Messrs. R. Wheaton (chair), H. Ayris, A. Burfitt, A. Stirling, jun., W. J. Matthews, H. J. Wiadrowski, H. C. Williams (Hon. Sec.), and three visitors.

SUMMER FORAGE CROPS.—The paper on this subject, contributed by Mr. Colebatch at the Annual Congress in September last, was read and discussed. Members agreed that the suggestions contained in the paper were applicable to Kangaroo Island, where the rainfall was good. Mr. Ayris pointed out that it would be necessary to clear the land of stumps before maize or sorghum could be thoroughly cultivated. The Chairman had successfully grown sorghum and two varieties of maize, viz., Planter's Friend and Ninety-day. The Hon. Secretary recommended the planting of Cape barley for early feed.

Morphett Vale, January 17.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. A. O. Pocock (chair), F. Rosenberg, H. O'Sullivan, T. Anderson, E. Perry, G. Gilbertson, L. R. Christie, A. Anderson, J. Perry, A. Connole, T. Higgins, W. Goldsmith, E. E. Hunt (Hon. Sec.), and one visitor.

BARLEY IN LIMESTONE COUNTRY.—Mr. W. Goldsmith read a short paper, in which he said that after a crop of wheat grown on fallow ploughed to a depth of 3 in. to 3½ in. barley was the best crop to grow, as it only required the ground to be worked to a depth of from 2 in. to 2½ in. A shallow working before sowing was necessary, even if it delayed the sowing a week, as the fine surface held the moisture and the grain was more likely to fill. Sowing at the rate of a bushel to a bushel and a quarter per acre was recommended. If sown too thickly it would blight. The direct return per acre for hay and barley would be about equal; but, in addition, the latter would keep two breeding ewes for about two months, which made it a more payable crop than the hay. He had found blackheads worse on land that had lain out than on cultivated land. Pickling did not seem to remove the trouble.

SEED WHEAT.—Members thought it was preferable to sow large grain rather than small average grain on clean ground, as it was found that the former stood better in a dry season.

SOUTH-EAST DISTRICT.**Kalangadoo, December 13.**

At the invitation of the Mount Gambier Branch a number of members of the Kalangadoo Branch accompanied the former on their annual tour of inspection of the district. The farms and homesteads of several members were inspected, as a result of which much practical information was elicited. It was seen that the allottees of the Moorak blocks were losing no time in making use of their land. Fences seemed to have sprung up in the night: iron huts were on some properties, while on others quite pretentious stone houses were in course of erection. The luxuriant grass had been cut and stacked. Alongside of Yell's Road, on one block was noticed a fine lucerne patch, very recently cut, but green and flourishing again. Several paddocks already contain potato crops. Along the Bay Road the condition of the crops generally promised well. At Mr. J. E. Buck's property a fine grass paddock was noticed. This land, which was at one time thickly covered with ferns, had been cleared with the disc plough. There was a good deal of *Trochilium subterraneum* scattered about the paddock, but the sheep had nibbled it off close. It could be seen along the edges of the crops and coming up amongst the potatoes. A paddock of White Tuscan wheat, which had been sown at the rate of 1½ bush. to the acre, only yielded about half a bushel, showing that this wheat requires a hard bottom. Paddock No. 4 was sown with malting barley, planted on July 3rd on fallowed land. It had gone back owing to the dry weather, but would yield 20 bush. to the acre. This was on a paddock which was formerly all ferns. Mr. Buck showed the working of a circular saw driven by a Pagschaw petrol engine, the saw having a very handy and self-cleaning sliding on thin iron rails. A chaffcutter fitted with an elevator carrying the chaff over the top and getting rid of the dust by a simple grating on the lower side of the elevator, was

also driven by the engine. A large number of pigs, including an old champion, were seen. West of the house crops of potatoes, barley, and oats were critically inspected. The malting barley was planted on July 25th, and looked fairly well, though a bit mixed. On the north side of the house a crop of Cape barley looked poor, while there was a very good wheat crop adjoining. At the Benara boundary a mob of 50 of the Estate's bullocks were rounded up and duly admired. Leaving Mr. Buck's and driving back towards the Mount a very well grown crop of barley was noticed in Mr. Kerin's property. The barley had a strip of wheat round it, to be cut for hay, and advantage taken of the edge left bare to take measures to defeat the predatory designs of the grubs should they appear. Mr. Kerin's potatoes also looked well. Mr. Mellor explained to the party his method of making concrete with dolomite and cement, and exhibited a pig trough, cowshed, floor, &c., of the material. The flooring blocks were 2ft. by 1ft. by 3in. thick, and cost 1s. each. In the O.B. Flat district many excellent crops of potatoes were seen, and going towards Square Mile a good crop of barley and some very nice potatoes touched by the frost were observed in Mr. E. Unger's. Taking into account the dry spells, hot winds, and lack of rain during November, the crops promised better than might have been expected. Here and there the potatoes suffered from the frost of a few nights ago, but on the whole the potato-growing industry was still the leading feature of the district. The visitors were surprised at both the extent and the healthiness of the crops.

Keith, December 9.

PRESENT.—Messrs. Lambert (chair), Makin, Morcombe, Leishman, Pearson, Fulwood, Schultz, Hutchings, Tyner, Shannon, and Lock (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—Due consideration was given the proposal to substitute the system of weighing wheat in bulk for that at present in operation. Members thought it necessary that the Government should instal weighbridges in railway yards. It was decided that the Branch should afford the proposal its support.

Millicent, December 19.

(Average annual rainfall, 28½in.)

PRESENT.—Messrs. Holzgrefe (chair), Hart, Oberlander, Bowering, Day (Hon. Sec.), and one visitor.

DESTRUCTION OF RABBITS.—The following paper was read by Mr. Hart:—"I have come to the conclusion that in sandy country there is nothing to beat the spade for the purpose of exterminating rabbits. I have been conducting experiments on about 20 acres of sand thickly covered with fern. After netting this area I mowed some of the heaviest of the ferns to give the dog a chance to find the rabbits. I dug the holes back until they were 15in. to 18in. deep, so that they would hold loose dry sand. Into pop holes, where no sand was available, I pushed about three ferns with a mixture of coal tar and grease smeared on them. I melt the coal tar and grease together, measure out one to two tablespoonful into an old bucket, and with a forked stick wipe the ferns round the bucket and push them down the hole. This forces the rabbits to where there is loose sand. The grease keeps the tar from drying. There were about 10 burrows with from 10 to 50 holes each on the 20 acres, and it took me about one day to fill them in. Some rabbits never got out, and those that did were destroyed by the dogs. Two full-grown rabbits were hunted into an old burrow in the garden. There were two main holes and a pophole underneath a boxthorn hedge. There was a lot of dry sand under the hedge, so I resolved to rely upon the dry sand without the aid of the carbon. I dug the two main entrances back till they joined about 18in. below the surface, and piled up dry sand until there was a heap fully 18in. high, and tarred the pop hole. On the fourth morning I found the rabbits had caused about two buckets of sand to run in. I gave them some more and waited till they had been in exactly seven days. I then took the dog and started to remove the heap of sand which was as I had last left it. I drove the spade against a dead rabbit at about the surface level. The mode of procedure where ferns are thick, and it is necessary to get at the rabbits at once, is as follows:—While the sand is dry and ferns freely, net the paddock, brush the ferns down with a heavy ribbed roller or heavy drag. Dig the holes well back and fill them with dry sand as before mentioned, keep the holes filled, and if the ferns are levelled down, the dog will soon clear out the pest.

Before the wet season get a good burn, then take out all the snags so that a mower can be used. Keep the mower going till the ferns are beaten. In the meantime drill in some manure and grass seeds, and grow grass instead of rubbish to harbor rabbits. Carbide tins with the bottoms cut out hold a nice lot of sand to puzzle the rabbits. The spade process makes the land fit for the horses and the mower. Fumigating, poison, &c., do not. Even if fumigation or poison kills all the rabbits for the time, the burrows still have to be dug in before machinery can be used. Two men can properly fill in more holes with the spade and sand process than they can fumigate. On peat soils it is advisable to dig out and remove all spoil banks where practicable. Some are easily coped with by burning, after digging a trench to prevent the fire from spreading. Others, such as pinchgut, are more difficult to destroy. I have not much difficulty in keeping the rabbits down on the peaty land, but I have a few trees alongside a private drain, and they start from the side of the drain and go under the roots of the trees where the spade cannot go, but tar or straw, or other material puzzles them and gives the dog a chance. Ploughing is advocated by some, and it is all right if properly done in the wet season. The furrow horse will break through after the sod is turned, and to make the land safe for valuable horses to work on for years after one or two men will be needed with spades to follow the runs as they are found by the furrow horse breaking through. It is much better, too, for teams at first ploughing. I treated four acres in this manner two and a half years ago, and the rabbits have not found the old burrows. Poisoning, fumigating, and trapping in various ways have been tried, but the rabbits are not less numerous. It is necessary to clear off the ferns, keep them cut, drill in manure and grass seeds, and so grow feed instead of a harbor for vermin." A lengthy discussion followed the reading of the paper. Mr. Bowering did not think rabbits were likely to take phosphorus and recover. When it was used with wheat the phosphorus evaporated, but with pollard it was not so. The water used for dissolving the poison should be almost boiling. Mr. Holzgrete advocated the frequent use of the poison cart during the summer. Besides poisoning in the ordinary way, Mr. Oberlander had placed strychnine in a small hole bored in fruit, generally pears, and the experiment had been attended with satisfactory results. Members, however, thought the practice dangerous. Mr. Day strongly advocated the erection of netting fences. The Chairman said carbon should always be used when mixing the phosphorus, as it greatly minimised the danger of fire.

Mount Gambier, December 13.

(Average annual rainfall, 31½ in.)

A tour of the district, which is made annually by the Mount Gambier Branch, took place on the 13th December, on which occasion they were accompanied by the Kalangadoo Branch as guests. Details of the trip are printed on page 774.

Mount Gambier, January 13.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. A. J. Wedd (chair), Dow, Sassanowsky, Pick, Keegan, Pritchard, Major, Wheeler, Schlegel, G. and D. Collins (Hon. Sec.).

STOMACH WORMS IN SHEEP.—The following paper was read by Mr. J. Keegan:—"The stomach worm which attacks sheep is generally recognised as one of the most serious pests with which the sheepfarmer has to contend. Sheep of all ages are subject to the trouble, but the most serious effects are seen in lambs. While full-grown sheep, although badly affected, may show no apparent symptoms of disease it is from these, through the medium of the pasture, that lambs become affected. The symptoms are anaemia, loss of flesh, general weakness, dullness, capricious appetite, thirst, and diarrhoea. The anæmic condition is seen in the paleness of the skin and mucous membranes of the mouth and eye, and in the watery swelling which often develops under the jaw. A more certain diagnosis may be made by killing one of the flock and opening the fourth stomach. The contents of this should be allowed to settle gently, and by carefully watching the liquid the parasites, if present in any number, will be seen wriggling about like little snakes, from 1½ in. to 1 in. long and about as thick as a pin. The worms in the stomach produce eggs of microscopic size, which pass out of the body in the droppings and are thus scattered broadcast over the pasture. If the temperature is above 40° to 50° F. the eggs hatch out in from a few hours to two weeks. When the temperature is below 40°

the eggs remain dormant, and in this condition may retain their vitality for two or three months. If the weather becomes warmer the tiny worm which hatches from the egg feeds upon the organic matter in the manure, and grows until it is nearly one-thirtieth of an inch in length. Further development then ceases until the worm is swallowed by the sheep, after which it again grows and reaches maturity in the fourth stomach of its host in two or three weeks. The chances of the young worms being swallowed are greatly increased by the fact that they crawl up blades of grass when sufficient moisture, such as dew, rain, or fog is present, provided that the temperature is above 40°. When the temperature is below 40° the worms are inactive. The young worms which have reached the stage when they are ready to be taken into the body are greatly resistant to cold and dry conditions. At a temperature of about 70° young worms have kept alive for so long as six months in enclosures which have been pastured by affected sheep. It is uncertain whether worms in fields from which sheep have been removed will die out more rapidly during warm or cold weather. It is, however, safe to say that a paddock which has had no sheep upon it for a year will be practically free from worms, and fields which have had no sheep upon them following cultivation may also be safely used. The time required for clean pasture to become dirty with worms after affected sheep are placed upon it depends upon the temperature. The field does not become infectious until the eggs of the parasites contained in the droppings of the sheep have hatched out and the young worms have developed to the final larval stage. It may be stated here that neither the eggs nor the newly-hatched worms do any mischief, and only those worms which have reached the final larval stage are able to continue their development when swallowed. This final larval stage is reached in three to four days after the eggs have passed out of the body of the host if the temperature remain constantly at 95°. At 70° six to fourteen days are required, and from 46° to 57°, averaging about 50°, three to four weeks are required to hatch the young worms to the infectious stage. At a temperature below 40°, as already stated, the eggs remain dormant. This shows clearly the advisability of providing frequent changes of clean pastures for ewes after lambing to prevent the lambs from becoming infected with this class of worm. If desirable, the ewes could be given a worm drench before or after the birth of the lambs. If before, the ewes should be treated before pregnancy is too far advanced, and then put on clean pasture. If treatment is decided on, the animals should be deprived of food for 12 to 18, or even 24 hours, before they are dosed; and if bluestone is used no water should be given on the day they are dosed, before or after. It is important not to raise the head too high when administering bluestone, on account of the danger of the dose entering the lungs. The nose should not be raised higher than the level of the eyes. The animal may be dosed either standing on all fours or set upon its haunches. It has been found that if the dose is taken quietly by the sheep in the standing position most of it will pass to the fourth stomach, hence the standing position should be adopted. Great care should be taken, not only in dosing, to avoid the dose getting on the lungs, but also in the preparation of the remedy, so that the solution may not be too strong or the dose too large. And whatever remedy is used it is wise to test it on one or two before the whole flock is dosed." He gave the following prescriptions for the treatment of stomach worm:—Coal tar (creosote) in water. The dose of this 1 per cent. mixture consisted of, for a lamb four to twelve months old, 2ozs. to 4ozs. 2. Bluestone, copper sulphate, in water; only clear blue crystals should be used; bluestone with white patches or crust should be rejected. Dose—Lambs, three months old, $\frac{1}{2}$ oz.; six months, 1 $\frac{1}{2}$ oz.; 12 months, 2 $\frac{1}{2}$ ozs.; 18 months, 3ozs.; 24 months, 3 $\frac{1}{2}$ ozs. 3. Gasoline—Lambs, $\frac{1}{2}$ oz.; sheep, $\frac{1}{2}$ oz., to be given in oil, linseed, tea, or milk. The dose of gasoline should be given once daily for three days. The evening before the first treatment the sheep should be shut up without food or water, and dosed about 10 a.m. next morning. Three hours later they could be allowed food and water, but should be shut up again at night, and dosed the second and third mornings as on the first. In discussing the subject the Chairman said "worms were very troublesome in the low-lying districts. Thousands of sheep succumbed yearly to this parasite, and one station alone had this year lost 3,000. When the sheep were in good condition they threw the worms off, but if they began to scour it was a very difficult matter to save them. Where it was possible to secure a good burn of grass a great deal of good was done in this way by destroying the worms. Mr. Collins had some years ago successfully treated the trouble in the early stages with turpentine and oil. Mr. Schlegel pointed out that in Germany it was the practice to grow mustard as a preventive. They turned the sheep on to this before it had flowered for about half an hour or an hour at a time. Mr. P. Pritchard had noticed a large number of rabbits die lately, and on opening some of them had found them infested with these worms, or what he took to be the same worms. The stomachs of the rabbits were in the most inflamed state, and there were large numbers of worms in them." Mr.

A. Dow thought that all sheep were infected with worms to some extent, and that particular sheep were better able to withstand them than others. No doubt a change of pasture would do a great deal of good. In his experience this was far more effective than a drench.

Penola, December 9.

(Average annual rainfall, 26½ in.)

PRESENT.—Messrs. Richardson (chair), McDonald, Alexander, Adamson, Norman, Fullerton, Miller, Darwent, McBain, Kilsby, and Ockley (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—A discussion took place with reference to the proposal to institute the system of selling cattle by live weight. It was pointed out that many farmers who only occasionally sent cattle to market were unable to accurately judge the weight of the carcass. If the exact live weight of the beast were known a more reliable estimate of the dressed weight could be arrived at. It was resolved that the proposed alteration would be an improvement.

Farm Laborers' Blocks.—The proposal to survey small blocks for farm laborers in new hundreds did not present itself to members as capable of being carried to a successful issue. Whilst some blockholders would utilise their holdings in accordance with the ideas embodied in the scheme, it would be generally found that the majority would sell to neighbors, with the result that the blocks soon became merged into a farm capable of maintaining the occupier.

Noxious Weeds.—Mr. Adamson complained of the laxity of the local council in enforcing the provisions of the Noxious Weeds Act. Travelling sheep carried the seeds of the star thistle for miles, and the plant was spreading on the roads. It was necessary that immediate action should be taken to prevent the weed securing a hold in the district.

Drying Fruit.—The following paper was read by the Chairman:—"The subject of fruit-drying is a most important one to all orchardists, for of all the methods employed for preserving fruit none lends itself so readily to the ordinary grower. The process of sun-drying does not require great technical skill. It is cheap, and neither vessels, sugar, or other auxiliaries, except trays, are necessary. Generally speaking, the climate of South Australia is peculiarly suitable for fruit-drying. The product possesses excellent keeping qualities and, if not too highly sulphured, retains a natural flavor, and is a healthy and agreeable food, which is largely consumed in the interior of the continent where fresh fruit is not available. The dried fruit of to-day is entirely different from that of former years. The system of preparation was then primitive, but the advent of evaporators and more scientific methods has wrought a great change in the business, and the demand has correspondingly increased. The orchardist need not now be content with what he can get for his fresh fruit, having by this method a ready means of utilising his crop at a fairly remunerative price. With the apricot the fruit should hang on the tree until it reaches a perfectly ripe, but not over-ripe, condition. This, in a large orchard is found impracticable when anything like a crop has to be handled. It is necessary to keep ahead of the crop and allow the ripening process to go on in the cases. This practice results in more uniformity of color. The fruit is then ready for pitting and should be cut in halves with a sharp knife or cutter and placed evenly on the drying trays out side up, and as soon as possible removed to the fumigator. When fruit is once out it should not be exposed to either sun or wind. Everything being ready, sufficient sulphur (according to the charge of fruit) is placed in a cast-iron pan with a little wool to start the burning. This should be immediately placed in the fumigator, which should be made airtight. The fruit should remain in the sulphur-room for from 10 to 12 hours (according to the quantity), which is about the time required for the pulp to fill with juice. No definite rule can be laid down as to the quantity of sulphur required, but the regulations under the Food and Drugs Act, 1908, provide that it shall not contain more than 0.015 per cent. of sulphurous acid or its compounds calculated as sulphur dioxide. After fumigating or sulphuring, the fruit should be taken out and placed either in the sun or an evaporator. If it is placed in the evaporator it should not be put in the hottest part immediately, but should be gradually worked from the cooler to the hotter parts, commencing, say, at 130° to 140° and finishing off at 160° to 180°. Treated with care in this way it should dry in about 24 hours. Some practice is necessary to judge when it is sufficiently dry. The time will vary also according to the construction of the evaporator. In sun-drying the trays should have cleats on the under sides, so that a current of air can pass underneath. This assists very materially

in the drying process. If the temperature is favorable from two and a half to four days will be required to dry large fruits. If possible grading should be done during the cutting process; this gives an even drying on each tray and saves labor in sorting over and removing half dried fruit, which is inevitable should all sizes be placed on one tray. When sufficiently dry the trays should be emptied into sweating-boxes and allowed to remain for a few days. The fruit should then be put into clean calico bags with the necks securely tied, thus preventing the ingress of the moths. If left in boxes eggs will be deposited and the grubs will soon be found, the result being that the fruit will spoil and a resulphuring will be necessary. Store the fruit in a cool dry place, for if it is exposed to high temperatures it will lose in weight, become hard, and deteriorate in quality. Peaches are treated in a manner similar to that adopted for the apricot. Freestone, possessing a firm yellow flesh and not too juicy, is the only variety suitable for the purpose. The fruit should be above medium size. The clingstone can be dried, but does not sell readily. The extra return for peeling does not pay for the labor, and all peaches go on the market unpeeled. They should be cut in the same way as apricots, and in order to get a good color they should be well sulphured. They should be removed from the evaporator while quite pliable, and not allowed to over-dry. Kiln-drying peaches gives them a bright golden color. The best varieties of dark prunes for drying are Prune Dagen, French prune, Fellemborg; and of the lighter varieties Golden Drop and Reine Claude are the most suitable. The fruit should be thoroughly ripe when picked, and should be immersed in a solution of 1lb. concentrated lye to 10galls. water brought to the boiling point. It should then be placed in a perforated wire cage and immersed for from 5 to 10 seconds, according to the toughness of the skin, so that the skin may be slightly cracked, and then dipped again at once in fresh cold water. It should then be spread on trays. The light-colored prunes should be sulphured so as to set the color well, then placed in the sun or evaporator. If the latter is used, care must be taken that the temperature does not exceed 125° when the fruit is just placed in it. It can be gradually run up to 180° or 190°. Two, three, or four days are required for the process, according to the size of the fruit. It should be firm and pliable to the touch, and when removed, placed in sweat-boxes for two or three weeks. Before packing for market it should be again dipped in a hot liquid of glycerine, saccharine, or olive oil. This gives a brightness to the fruit. It should then be graded and packed in 28-lb. boxes lined with paraffin paper. As with the apricots, the grading should be done by means of a mechanical grader. Some difference of opinion exists as to whether lye-dipping or pricking is the more suitable for dealing with this fruit. Each method has its advocates, and both have their place in the prune-drying industry, each serving best under special conditions. The smaller sizes are more suitable for pricking than dipping. Most varieties of apples will make a marketable dried fruit, although the most suitable varieties are the larger cooking, with firm white flesh. The peeling, coring, and slicing is done by hand or power machine in the one operation. The fruit is sometimes placed in a weak brine to assist in keeping its color; but the ordinary sulphuring process is generally resorted to. Care must be exercised, because if left too long in the vapor it will become highly charged with sulphur, and consequently lose its value. As it discolors rapidly it must be placed in the fumigator as quickly as possible or the dried product will be second rate. If placed in an evaporator at a temperature ranging from 140° to 160° it will dry in from six to eight hours. After this it should be placed in a sweat and allowed to stand for a few days, so as to even up the bulk, and then placed in calico bags and securely tied. The Duchess pear is the only variety fit for drying. When ripe, these should be cut and the stalks drawn. The fruit should then be placed on trays, cut side up, and highly sulphured, or it will not keep its color. Hot weather is necessary to dry this fruit. Kiln-drying is mostly resorted to. The temperature may run up to 180° or 190°, and the time required for drying is from four to six days. The process necessitates considerable attention. The fumigator should be handy to the cutting-shed, and should be constructed to suit requirements as to size. Any material that will make an airtight box may be used, viz., matchboard papered on the inside; hessian, with a good coat of whitewash, or well-tarred linoleum or oilcloth. Trays should be stacked one on top of the other. A hole of from 12in. to 18in. deep should be dug in which to place a small iron pot. The mouth of the hole should run to the outside, in order that the pot may be pushed under when the sulphur is lit. It can then be covered with iron or board, and earth or sand should be placed so that the fumes cannot escape. The drying trays are made in various ways and sizes. Some prefer match-lining, as the boards dovetail into one another; others prefer laths. Handy sizes for two-men trays are 4ft. by 3ft. and 6ft. by 3ft., and a good one-man tray is 3ft. by 2ft. A good tray should have 2½in. by 1in. cleats, with the boards or laths securely nailed to same. A lath should be secured to each end of the tray, which prevents the cut fruit near the edges falling off. These

trays may also be utilised during other seasons for the purpose of storing other fruits, such as lemons, oranges, and apples. The drying ground should be clean, unbroken, and fairly level. Lucerne ground is unsuitable, as the fruit dries more slowly and moths are sometimes troublesome. A dry grass patch is best, as there is no dust, which is so much of a nuisance on the bare, unbroken ground." In discussing the subject, Mr. Darwent said the method of sun-drying did not impart a good color to apples. Prunes paid well, as they only lost about half their weight when drying. If he could get 5s. 6d. per case he would sell his fruit off the tree. It did not pay to dry windfall apples. In reply to a question as to whether the amount of sulphur required to treat a sulphurer half-filled with trays would be equal to the amount required when the complement of trays was to be treated, Mr. Richardson pointed out that, while not so much would be needed, the decrease would not be proportionate to the reduction of the number of trays.

Penola, January 6.

(Average annual rainfall, 26½ in.)

PRESENT.—Messrs. Richardson (chair), McDonald, Adamson, Strong, Williams, Fullerton, Ricketts, Peake, Miller, Darwent, and Ockley (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—Members were of opinion that the farmer was at a disadvantage under the present system of weighing each bag of wheat separately, as all fractions of a pound that each bag registered were claimed by the buyer, who could possibly gain 3lbs. or 4lbs. in every 100lbs. Therefore, if the whole load was weighed at once there would only be the one "draw," and consequently a more accurate weight would be obtained.

LIGHT HORSE BREEDING.—The discussion on Mr. Williams's paper on "Light Horse Breeding," which was printed in the December issue, page 599, was opened by Mr. Williams outlining the main points of his paper. The breeding of light horses, he said, was totally different from the breeding of cattle or sheep, the various strains of which were quite distinct and true to type; whereas the different breeds of horses had for generations been crossed to such an extent that it was now very difficult to follow any line. For light purposes the horse must please the eye, and also satisfy the rider or driver with regard to his ease of action and ability to perform the work required of him. He placed greatest faith in the low set thoroughbred and the Arab. The latter appeared small, but his endurance was marvellous. These two classes produced the best hack and hackney, but they should never be crossed with the draught. If they were crossed with the pony the progeny possessed good feet, and would stand a lot of work on hard metal. Mr. Darwent said the carrying capacity of the thoroughbred had been sacrificed for pace, the result being that nowadays one did not see the thick-set thoroughbreds, renowned for their stamina (popularly known as the old stock horse), which were in use in the past. Mr. Miller considered they were too low in front. Mr. Ricketts thought that the progeny of the Suffolk-thoroughbred cross, although pleasing to the eye as hacks, did not fulfil all the requirements of a hack. One drawback to the Arab and thoroughbred was that many of them presented a weedy appearance, which caused them to realise a low price in the saleyards, although they might possess great powers of endurance. Mr. Fullerton said that many good hunters were produced by crossing the Suffolk with the blood. A large proportion of the blood horses of the present day were faulty in the legs. All members agreed that the methods outlined by Mr. Williams produced the best stock for all light purposes.

DESTRUCTION OF THISTLES.—Mr. Fullerton drew attention to the scarcity of thistles in early sown crops, which was attributed by Mr. Adamson to the fact that where the crops got an early start they gained ascendancy over the thistles. Oat crops usually grew rapidly at the beginning, but generally wheat made poor headway when young, and allowed the thistles to become well established. In the destruction of the thistles following was essential, and working at seed time with a broad-tine cultivator would pull them out whilst they were young. The disc cultivator only cut off the top of the root and the remainder continued to grow.

Wirrega, January 6.

PRESENT.—Messrs. Exton (chair), Goldsworthy, Fairweather, Fry, Tillbrook, F. and J. Rogers, Laurent, Haynes, Tassie, Cook (Hon. Sec.), and one visitor.

SHEEP BREEDING IN CONJUNCTION WITH AGRICULTURAL PURSUITS—Mr Fyton read the following paper on this subject:—"The keeping of sheep in conjunction with agriculture is a source of considerable profit. When we get our land in working order and subdivided, we shall be able to make a good income from the sheep we can send to market. We shall have to grow fodder crops, such as rape, Algerian oats, and Thousand-headed kale, and by so doing shall increase the carrying capacity of our land. The system of bare fallow is a thing of the past in other parts of the country that I have visited. The plan followed now is to fallow for rape or oats for sheep feed, and so get the benefit of the droppings for the grain crop that is put in after the rape is done. The oats can be left for grain, or ploughed in for green manure. As soon as seeding is done the ground is ploughed, and the cultivators are kept going all through the dry weather, killing weeds and conserving moisture, and as soon as rains come in February or March the fodder crop is sown. The sheep run in the paddocks during the time they are being cultivated, and they assist in keeping the weeds down and eat the roots of such plants as sorrel. They are great scavengers and their droppings are valuable as a fertiliser. The usual plan is to sow 5lbs. of rape seed, 10lbs. of Algerian oats, and 1lb. of mustard seed, with 70lbs. of manure. Rape sown in February or March is ready for feeding in June, and can be fed down close, and then if allowed to come on again will make another good growth. It goes to seed in November, after which there is not much feeding. The paddock is then ready to plough for a grain crop. It is advisable to sow rape thickly, as it then sends its tap-roots down into the subsoil and gains access to plant food from which otherwise no benefit would be obtained. Rape sown thinly sends out roots from the side of the plant that feed near the surface. I saw rape in Bordertown sown in the spring, but it did not appear to have paid for the trouble of sowing it. It is a mistake to sow rape in summer, as it is liable to meet with dry weather or an attack of the blight. In a crop of rape sown in the summer you are only growing weeds to smother the grain crop that is to follow, and you get little return from either grain or rape. The early crops of wheat or oats will benefit from being fed down till the beginning of August, as sheep will eat all the frosted leaves, and so give the plant a fresh start. The sheep also tread the ground firm round the roots and the plant stools far better as a consequence. Thousand-headed kale requires stiffer land and a different mode of cultivation. Kale is grown in rows 2ft. 6in. apart with the plants 2ft. apart, and is usually cut for the stock. As you cut the branches off others grow. The most profitable sheep for the small farmer, in my opinion, is the Shropshire and Shropshire crosses, as you can keep more to the acre than of any other breed, and there are fewer rejects by the buyers. From a butcher's point of view the Shrop. has less wasty fat and more lean meat than any of the other breeds. The grasses with which I have been most successful are Rhodes, *Philoris commutata*, Prairie, Tall Oat, and Meadow grass. Some of the millets will do well here in an ordinary season, and they are good sheep fodder. I had rape in Gippsland that grew 30in. in seven weeks. With only half that growth we will be able to do well with sheep in conjunction with agriculture. As soon as we can get our blocks fenced and can run sheep we can grow enough wool to pay the interest on the expenditure and household expenses." Considerable discussion ensued. Rape was thought better than kale, in that it did not require the thinning out or after cultivation that kale did, although kale produced more feed and could stand more adverse conditions than rape. As regards the sowing of mustard with rape as a preventive to bloat in sheep, members thought it generally useless, as sheep invariably preferred rape to mustard and, as a rule, ate out rape before they touched mustard. Mr Fry had had experience in this district with grasses, and the varieties that did best with him were Cocksfoot, Sheep's Burnet, Yorkshire Fog, and lucerne. Rhodes grass suffered severely from frost. It was thought that there was more loss of lambs in lambing when the Shrop. ram was used on Merino ewes.

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J. P. WILSON,

MINISTER OF AGRICULTURE.

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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Value of Wheat Cultivation.

Some interesting statistics referring to production in South Australia have been made available by the Government Statist. The importance of the wheat harvest to the State is shown by the fact that the production of grain for each of the five years preceding the present season has averaged 21,095,664bush., and inclusive of the wheaten crop the mean annual value for the five seasons was £5,142,261; the value of the 1910-11 wheaten grain and hay crop on the average prices to date of writing being £5,392,933. As intimately associated with wheat culture, the fact should be remembered that the capital invested in machinery and implements owned by the farmers was in 1910 assessed at £2,349,819; and, further, that the prosperous condition of the farming industry is directly reflected in the activity of many of the secondary industries of the State, notably the agricultural implement and machine factories, which for 1910 numbered 60, employing 1,544 hands, and turning out work valued at £372,175. There is reason to be gratified with the record of wheat culture for the whole State. The figures for 1910-11 season are—wheat for grain, 2,104,717 acres; 24,344,740bush., average per acre 11·57bush. Mean for last five seasons—wheat for grain, 1,826,817 acres; 21,095,664bush.; average per acre, 11·55bush. The Lower North division has averaged for the last five seasons 7,489,987bush. of wheat, or 14bush. per acre.

The Stockowners' Guide.

The Stockowners' Guide, which has recently been published by the proprietors of *The Pastoralists' Review*, should prove useful to those engaged in farming or pastoral pursuits and kindred industries. The volume contains a great deal of practical information, given in a clear manner, on a variety of subjects relating to station and farm appliances and improvements, and is profusely illustrated. Among the matters dealt with are fencing, water supply, drafting yards for sheep and cattle, sheep and cattle dipping and dips, buildings, bush fires, rabbit destruction, irrigation, and ensilage. Incidentally it may be mentioned that the drawings relating to the building of an adobe cottage appeared in the February, 1909, issue of the *Journal of Agriculture*.

A 50 Years' Record.

During the 50 seasons, 1861-2 to 1910-11 inclusive, the average annual number of acres of wheat sown for grain in South Australia was 1,357,187 acres, off which 484,108,365 bush. were reaped, giving an average annual yield of 9,682,167 bush., or 7·13 bush. per acre. During the same period the State exported 8,684,900 tons of breadstuffs, valued at £72,280,499. The average price of wheat at Port Adelaide during the 50 years was 4s. 6½d. per bushel.

Exposing the Robber Cow.

Under the above heading *The New Zealand Farmer* publishes the results of tests of the dairy herds owned by certain suppliers to the Thames Valley Dairy Company. In all about 2,000 cows were tested, and the results should cause farmers and dairymen who do not keep a record of the milk production of their cows to ponder deeply. "The disparity," says the writer of the article, "between the herd which gave the highest average and the herd which gave the lowest average is so great that it can at once be seen how the profit of herds, or of groups of herds, may be seriously lessened, if not turned into a loss, by the presence of the robber cow. In the best herd (average 46·55lbs. butter-fat) there were 25 cows, and the money value of the fat, at 1s. per pound, was £2 6s. per cow; but the best cow in the herd produced £2 18s. for the month, as against £1 13s. by the worst cow. In the worst herd (average 17·52lbs.) there were 11 cows, with an average production per month of only 17s. 6d. worth of butter-fat. In this case the best cow (of the 11) was worth but £1 3s. for the month, while the worst was only worth 11s. ! Fancy feeding, milking, attending, and owning a cow whose gross yield was less than 5d. per day." The thirty-day average butter-fat yield of the 10 highest cows was 74·55lbs. each, and that of the 10 lowest only 11·0lbs. each. With 2,000 cows the annual cost of testing in Thames Valley is estimated at 3s. per cow for the first year and 2s. 6d. per cow thereafter.

Area under Crop.

The area under crop in the Commonwealth in 1910-11 aggregated 11,893,478 acres, or an average of 2·72 acres per head of the population. In proportion to population South Australia had the largest area under crops, viz., 2,746,334 acres, an average of 6·90 acres per head of the population. The averages of the other States per head were—New South Wales, 2·07 acres; Victoria, 3·08 acres; Queensland, 1·13 acres; Western Australia, 3·15 acres; and Tasmania, 1·50 acres per head.

Demand for Artificial Manures in Japan.

In consequence of the increasing requirements of Europe and the United States for soya bean cake as a feeding stuff, there have been marked decreases in the imports of the cake into Japan, where it is used as a manure. Partly as a result of this there is at the present time an increasing demand for sulphate of ammonia, nitrate of soda, and phosphates in Japan. The imports of sulphate of ammonia in 1910 were 69,000 tons, valued at £925,500, as compared with 46,000 tons in 1909 and 66,000 tons in 1908. This manure is obtained almost entirely from the United Kingdom, 57,000 tons of the 69,000 tons imported in 1910 coming from this country. It is stated that sulphate of ammonia will always be required for wet land cultivation, *i.e.*, for such crops as rice and the rush used for making matting. Nitrate of soda, on the other hand, being essentially a manure for dry land cultivation, is used in Japan for mulberry, tobacco, tea, wheat, barley, rye, indigo, and vegetables. The imports of this manure rose from 6,000 tons in 1909 to 14,000 tons in 1910. Phosphates increased in the same period from 70,000 tons to 167,000 tons. The total import of manures is valued at £3,869,000, and the home production of artificial fertilisers at £3,023,000. It is estimated that if the value of the other manures used is added the total annual consumption would probably amount to £17,000,000.—*Journal of British Board of Agriculture.*

British Imports of Agricultural Food Products.

The total value of the principal articles of food imported into the United Kingdom in 1911 was £190,712,000, as against £189,418,000 in 1910, £191,505,000 in 1909, £183,957,000 in 1908, £188,353,000 in 1907, £181,604,000 in 1906, and an average of £177,047,000 in the three years 1903-5. These figures represent the value (cost, insurance, and freight) as declared to the Customs officers at the port of arrival, of the grain and flour, meat and animals for food, butter, cheese, eggs, condensed milk, fruit and vegetables, hops, lard, and margarine, which may be grouped together as agricultural food products in the sense that they compete more or less directly with the home supply. The increase in value during the past year, as compared with 1910, was due to the increased cost, on the whole, of the meat (of all kinds) and dairy produce imported.

South Africa's Fresh Fruit Export Trade.

The fresh fruit export trade of South Africa has shown a remarkable development during the last six years. According to figures published by the Unions' Trade Commissioner in London the number of boxes of all varieties of fruit exported from the Cape Province each year from 1906 to 1910, inclusive,

was as follows :—1906, 59,866 boxes ; 1907, 82,335 boxes ; 1908, 172,922 boxes ; 1909, 173,922 boxes ; 1910, 201,871 boxes. The number of boxes shipped in 1911 from all ports of the South African Union totalled 245,549 boxes, the principal lines being—Peaches, 27,800 boxes ; pears, 62,067 boxes ; plums, 47,560 boxes ; grapes, 86,030 boxes ; and apricots, 8,121 boxes.

Sheep-Feeding Experiment.

The Agricultural Department of the University College of North Wales have conducted a very interesting feeding experiment involving the use of soya bean cake with sheep. Two lots of sheep—15 in each lot—were selected. Lot No. 1 received sliced swedes, hay, $\frac{1}{2}$ lb. per head crushed oats, $\frac{1}{2}$ lb. per head soya bean cake. Both lots had as much swedes and hay as they would eat, the amounts consumed being practically the same in both cases, 7lbs. of swedes and $\frac{3}{4}$ lb. of long hay per head per day. From January 10th until March 10th the sheep in lot No. 1 gained 125lbs., whereas those in lot No. 2, which were fed on linseed cake, gained 154lbs., an increase of 29lbs. over those fed on the soya bean cake. From January 10th to March 10th lot No. 1 consumed 221lbs. soya bean cake, lot No. 2 an equal amount of linseed cake. The 221lbs. soya bean cake cost 13s. 10d., as compared with 19s. for the 221lbs. linseed cake. It is evident, therefore, that the extra increase of 29lbs. produced by the linseed cake was obtained by an expenditure of 5s. 2d. The sheep were sold by auction on March 14th, and averaged 5d. per pound live weight. The 20lbs. increase was, therefore, worth 12s. 1d. As it was obtained at a cost of 5s. 2d., the net gain in favor of the linseed cake was 6s. 11d. A, the sheep in this lot handled rather better than those fed on soya bean cakes the difference in favor of the linseed cake was somewhat greater than is shown by the figures. The experiment shows, however, that the soya bean cake is a good feeding stuff, and as its manurial value is higher than that of linseed cake, the prices paid for the two most probably represent fairly accurately their relative values.

Wasting Time.

A good day's work is worth a good day's wage, and the branch of farming that will not do this and leave a small profit to the owner should be left severely alone. In no branch of farming probably is this more evident than in dairying. There are too many cows in our herds that do not produce enough butter-fat to pay for their feed. It is difficult enough to get reliable men to milk cows, but it does not minimise this trouble when such men are engaged in attending to very unprofitable milkers. Even under normal conditions there are numerous instances where the returns of a herd of 35 cows do not exceed

those from a herd of 20; but in getting this return it necessitates the extra time, labor, and patience in milking an extra 15 cows twice a day. Assuming that 12 cows are milked in an average hour, this means that two and a half hours are lost in unremunerative labor every day, which from the same sized herd in a year would amount to over 90 days, taking 10 hours as a working day. This ought to be proof enough that it is very easy to waste valuable labor on a dairy farm.—*Sydney Morning Herald*.

Future of Australian Wheat Industry.

In an article on "Wheat and its Cultivation," appearing in the February number of the *Victorian Journal of Agriculture*, Mr. A. E. V. Richardson, M.A., B.Sc., writes:—"The future of the Australian wheat industry is largely dependent on the profitable utilisation of those vast areas at present considered outside the margin of 'safe' farming. From the remarkable developments that have resulted during the last decade in the profitable opening up of lands that hitherto were considered practically useless, it is quite apparent that it is not safe for anyone to predict the possible confines of profitable wheat-farming in the future. To further extend the zone of profitable cultivation it is evident that attention must be concentrated on those factors which will enable the grower of the future to raise wheat successfully on the more arid portion of the Commonwealth."

Apples on River Country.

"No possibility of doubt exists as to the especial suitability of the river country for the production of a high-class pear, but it is still an open question (says *The Renmark Pioneer*) whether it will pay to grow apples on a commercial scale. The qualities of Renmark apples for export purposes have not yet been tested; but in such matters as color and uniformity of size from year to year the local product will more than hold its own with that of rainfall districts."

Churnability of Cream.

"In an article in the *Journal of the Agricultural Society*, by Messrs. Cooper, Nuttall, and Freak, of the Cooper Research Laboratory, dealing with the fat-globules of milk, a number of investigations are described which were undertaken with the object of explaining the variations in the behaviour of cream in churning. It appears that the cream of various breeds—and even the cream of individual cows—shows a persistent difference in behaviour as regards

the time required for churning and the amount of fat recovered in the form of butter. It appears that cream in which the average size of the globules is large gives the best results for butter-making, whereas for cheese-making the smaller globules give better results. The authors describe the ingenious apparatus they have devised for carrying out these investigations on the 'churnability' of milk. They are unable to announce a solution of the various problems to which the subject gives rise, but it is hoped that a more extended series of experiments will yield valuable results."—*Journal of British Board of Agriculture*.

Pork and Artichokes.

At the Hawkesbury Agricultural College they have an acre of sandy loam which was planted with Jerusalem artichokes several years ago. In April every year they bring a portable pig-house on to the ground, and 60 young pigs are turned in to root out the tubers. The pigs do this willingly, and put on 11b. per head per day for six weeks. At the same time they manure the ground with their excreta. They are taken off before they have devoured all the tubers, because a few are required as seed for next crop. The ground is cultivated, being already sown with the remnants of the crop. The pigs are sent to market, when it is found that the acre of artichokes has produced over a ton of pork, worth about £50. The above reminds us of the gentleman (American, of course) who discovered that rats breed faster than cats, and established a large cat-skin farm. An equal number of cats and rats were turned into an enclosure. The cats kept down the surplus rats, whilst after the periodical harvest of cat-skins, the carcasses were thrown back as food for the rats; and so on for ever. But the artichoke yarn is quite true. Any reader can go to the College and see the work in progress; and, moreover, if he is a pig-breeder, he can repeat it himself on a waste corner of his farm.—*Agricultural Gazette of N.S.W.*

Electricity in Sheep-Breeding.

Professor Silas Wentworth, of Los Gatos, California, gives some curious information as to his experiments with electric influence on animal and vegetable life at his experimental farm on the Tyler Ranch, near Roseville. He states that the results of this work during the past year have proved that electricity more than doubles the lamb crop, and greatly increases the yield of wool. A flock of 2,000 sheep was divided, one half being placed in a field under the power wires of the Great Western Power Company, whilst the other half was removed from electric influences. In the field under the electric power line the production of lambs averaged a fraction over two lambs

to each ewe; in the adjoining field, where electrical influence was lacking, the lamb average was less than one to each ewe. Similar differences were noted in the yield of wool from the sheep in the two fields under notice. The fleeces from the sheep in the electrically influenced pasture proved to be 20 per cent. heavier than in the other cases. It is also stated that preparations have been made to plough up both fields and plant wheat, when the effect of the current on the growth of that cereal will be tested, and the results are awaited with a great deal of interest.—*Live Stock Journal*.

Imports and Exports of Plants.

During the month of January 5,124bush. of fresh fruits, 4,589 bags of potatoes; 170 bags of onions, and 52pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 702bush. of bananas (chiefly overripe) were rejected. Under the Federal Commerce Act 1,526 cases of fresh fruits, 110pkgs. of preserved fruit, and 2,220pkgs. dried fruit were exported to oversea markets during the same period. These were distributed as follows:—For London, 2,220pkgs. dried fruit; for India and East, 20pkgs. preserved fruit, and 1,157 cases apples; for New Zealand, 138 cases citrus fruit, 231 cases grapes, and 90pkgs. preserved fruit. Under the Federal Quarantine Act 547pkgs. plants, seeds, &c., were admitted. During the month of February 4,498bush. of fresh fruits, 1,548 bags of potatoes, 367 bags of onions, and 21pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 658bush. of bananas and 3bush. mixed fruit (chiefly overripe) were destroyed. Under the Federal Commerce Act 35,217 cases of fresh fruit, 3,531pkgs. dried fruit, and 251pkgs. preserved fruit were exported to oversea markets during the same period. These were distributed as follows:—For London, 19,922 cases apples, 825 cases pears, 2,460pkgs. dried fruit, 11pkgs. preserved fruit; for Germany, 10,930 cases apples and 554 cases pears; for India and East, 2,194 cases apples, 53 cases grapes, and 13pkgs. preserved fruit; for New Zealand, 699 cases grapes, 20 cases lemons, 1,071pkgs. dried fruit, 230pkgs. preserved fruit, and 20 cases pears. Under the Federal Quarantine Act 1,393pkgs. plant, seeds, &c., were admitted from oversea sources.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the enquirer must accompany each question. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

MANGE IN DOGS.

"Moockra" asks—"Please advise a remedy for mange in dogs."

Answer—The following will be found beneficial if applied twice a week and less often as improvement takes place:—Creosote, $\frac{1}{2}$ oz.; solution of potash, 1 oz.; olive oil, 7 ozs.; mix well.

"Coonalpyn" asks—"How and when to graft a peach tree about eight years of age, grown from a peach stone?"

Answer—Peach trees are seldom grafted with wood scions, but are budded by the shield budding method. A tree eight years old should be cut off down on the main arms and allowed to shoot afresh. Into these shoots the buds are inserted just above where the shoots emerge from the arms or old wood. Cut the tree back in August, and the young shoots should be ready for the buds by Christmas or earlier.



ROSEWORTHY AGRICULTURAL COLLEGE.

Harvest Report, 1911-12.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College.

(Continued from page 713.)

BARLEY.

In 1911-12 we had under six-row barley 76.09 acres distributed as follows:—“Ebsary’s” C, 38.48 acres; “Ebsary’s” B, 24.96 acres; “Flett’s,” 3.24 acres; Field No. 4, 5.91 acres; Pig Paddock B, 3.50 acres; total, 76.09 acres.

“EBSARY’S” C.

This field is covered with light soil of limestone formation characteristic of local mallee land. Its past history is summarised below:—1899, purchased and fallowed; 1900, wheat; 1901, bare fallow; 1902, wheat; 1903, bare fallow; 1904, barley; 1905, pasture; 1906, bare fallow; 1907, wheat; 1908, rape; 1909, bare fallow; 1910, wheat; 1911, barley.

It will be noticed that during the last six years this field has been four times under crop and twice under bare fallow. This represents a type of rotation which I think well adapted to local conditions.

In 1911 the wheat stubbles of the preceding season were ploughed up on a shallow furrow, and subsequently worked down to a suitable condition of tilth between March 28th and April 6th. Later on, between May 1st and 3rd, 62lbs. of Short-head barley of the fourth selection were drilled in with 2cwt. of 36/38 superphosphate. The land was quite dry at the time of sowing. In the early portion of the season there was a heavy undergrowth of clover in the field, and between June 27th and 30th the harrows were run over it without, however, doing much apparent good. It is as well to state that in the end the field ripened off perfectly clean—a clear proof that a well-grown crop of barley is well able to choke out weeds that would hinder the growth of oats or wheat. The crop was cut down between the 2nd and 7th of November for threshing, returning eventually 1,715 bush. 39lbs. of fine, plump, well-developed barley, or an average per acre of 44 bush. 29lbs.

I wish to draw particular attention to the results in this field, as they illustrate well, I think, the great value of six-row barleys in dry seasons, and consequently in dry districts. Here in an exceptionally dry season we have

a field nearly 39 acres in area carrying an exceedingly fine crop of barley immediately after a crop of wheat. And since the field had not been treated as bare fallow in the preceding season, the success of the crop cannot be attributed to "fallow rains"; nor again to rains immediately preceding seeding operations, since at seeding time the soil was quite dry, and the barley did not show above ground until close on to June. Hence the 7·82in. of rain that fell between seeding and harvesting operations were solely responsible for a crop going close on 45bush. to the acre. In Egypt, in the immediate neighborhood of Alexandria, where the average yearly rainfall is between 7in. and 8in., barley is the only crop that can be successfully grown without the aid of artificial irrigation; it owes this largely to its short growing period, and in this sense it may be said to be more drought-resistant than wheat. It has often been a matter of surprise to me that six-row barleys are not more generally grown in South Australia, particularly in the drier districts, where oats rarely succeed. There is not the slightest doubt but that barley at 2s. is more profitable than wheat at 3s. 6d., particularly when we take into account the fact that barley need not be preceded by a year of bare fallow. The comparison, however, of the two cereals one with the other is perhaps hardly fair, since I do not pretend that barley should displace wheat, but be grown in conjunction with it. With greater justice it may be stated that in my experience the rotations 1-bare fallow, 2-wheat, 3-barley, or 1-bare fallow, 2-wheat, 3-barley 4-pasture leave a greater margin of net profit in this district than the rotations 1-bare fallow, 2-wheat, or 1-bare fallow, 2-wheat, 3-pasture.

"EBSARY'S" B.

In this field, as has already been stated, there were 24·96 acres under barley. The past history of the field down to 1903 is the same as that already indicated for Ebsary's C. Variations that have taken place since that year are indicated below:—1903, bare fallow; 1904, oats; 1905, pasture; 1906, bare fallow; 1907, oats and wheat; 1908, pasture; 1909, pasture; 1910, bare fallow; 1911, barley and wheat.

This is one of the low-lying fields of the farm, and both in 1909 and 1910 it was under water for several months; hence, although the bulk of the field was treated as bare fallow in 1910, the area sown to barley in 1911 was not broken up until February of the same year. This portion of the field, which had been under water for long periods of time for two years, did not have time to sweeten, and at one time it looked as if the barley crop would turn out a more or less complete failure; eventually, however, it recovered, and, although short in the straw, it yielded very fairly.

The barley portion of the field was sown to two varieties of our own breeding of six-row barleys, viz., Roseworthy Oregon barley—area, 11·9 acres—sown on June 2nd at the rate of 65lbs. to the acre, with 2cwt. of 36/38 superphosphate; and Square-head barley of the fifth selection—area 13·06 acres—sown on June 2nd and 3rd under the same conditions as the preceding barley.

Roseworthy Oregon of the third selection yielded 33bush. 12lbs. to the acre, and Square-head barley of the fifth selection yielded 28bush. 18lbs. to the acre. If we take into consideration the poor appearance these barleys presented in the spring these yields must be considered as very satisfactory.

"FLETT'S."

In Flett's we had 3.24 acres of barley sown in small lots for special seed purposes. This field had been treated as bare fallow in 1910. Details concerning seeding and yields are shown below in Table VIII. :—

TABLE VIII.—Showing Seeding and Yields of Seed Barleys Sown in "Flett's."

Variety.	Selection.	Area. Acres.	Seed per Acre.	Date of Sowing.	Yield per Acre.	
			lbs.		Bush.	lbs.
Short-head	4th	1.81	56	May 29	50	17
Short-head	5th	0.79	60	May 26	51	27
Square-head	6th	0.43	60	May 26	39	39
Roseworthy Oregon ..	4th	0.21	60	May 26	61	17

This represents an average yield per acre for the four barleys of 50bush. 5lbs.

FIELD NO. 4.

This is the Permanent Experiment Field in which we had in 1911 about 5.91 acres under six-row barleys. Full information concerning cropping results in this field are always published in separate reports. It will be sufficient therefore to state here that the yield of this area proved to be 41bush. 48lbs. to the acre.

PIG Paddock B.

This is a field which is at times grazed by pigs and at times under crop. Its recent history is indicated below :—1906, rape; 1907, grazed; 1908, grazed; 1909, sorghum; 1910, kale; 1911, barley.

The kale stubbles were broken up with the plough on May 10th; we were not able to work down the soil until June 12th to 14th. On July 14th Roseworthy Oregon barley of the third selection was drilled in at the rate of 75lbs. to the acre with 205lbs. of 36/38 superphosphate. Even for barley this represented very late sowing, and the yield was proportionately satisfactory. Eventually the three and a half acres returned 120bush. 24lbs., representing a yield per acre of 34bush. 28lbs.

GENERAL BARLEY AVERAGE.

We gathered in 3,014bush. 20lbs. of barley from 76.09 acres, representing a general average yield per acre of 39bush. 31lbs. When we take into consideration the general character of the season, I think we may congratulate ourselves on these results. How they compare with the results of preceding seasons is shown below in Table IX.

TABLE IX.—Showing Average Barley Yields on the College Farm, 1904-11.

Year.	Rainfall.		Area.	Average Yield per Acre.	
	"Useful" Inches.	Total Inches.		Bush.	lbs.
1904	11.0	14.70	27.86	38	33
1905	14.23	16.71	65.73	25	4
1906	16.30	19.72	51.00	40	38
1907	13.81	15.05	79.30	31	21
1908	15.53	17.74	94.83	43	49
1909	21.15	23.05	75.27	35	0
1910	16.79	23.87	113.42	37	9
1911	8.19	12.42	76.09	39	31
Average of eight years	—	—	—	36	23

RYE.

For the last three years we have grown small areas of four varieties of rye, which I imported from France in 1908. In this State, I suppose, rye is valuable mainly for its straw. It may be added that the straw growth of these ryes has proved excellent in each season that they have been tested.

In 1911 these four varieties of rye were sown on May 26th, in Flett's, on land that had been treated as bare fallow at the rate of 60lbs. to the acre with 2cwts. of 36/38 superphosphate. Details concerning their respective yields are shown below in Table X.

TABLE X.—*Showing Rye Yields in 1911-1912.*

Variety.	Area. Acres.	Yield. Bush. lbs.
Multicaule Rye	0.50	11 24
Giant Winter Rye	0.51	9 45
Schlanstedt Rye	0.50	9 48
March Rye	0.49	20 9
Mean	2.00	12 43

I append below in Table XI. the average returns of the four varieties during the past three years.

TABLE XI.—*Showing Returns from Four Varieties of Rye, 1909-11.*

Variety.	Yields.				Mean Yield of Variety. Bush. lbs.
	1909. Bush. lbs.	1910. Bush. lbs.	1911. Bush. lbs.		
March Rye	7 46	16 4	20 9		14 38
Multicaule Rye	8 44	12 40	11 24		10 55
Giant Winter Rye	11 34	12 36	9 45		11 20
Schlanstedt Rye	4 3	15 14	9 48		9 40
Average yields of rye crops.	8 15	14 9	12 43		11 41

It should be stated that in Table XI. the average bushel weight of rye is taken to be 56lbs.

WHEAT.

It has already been stated that the area originally intended for grain crops of wheat was considerably curtailed in 1911 by incursions into it made to meet our home requirements of hay. Wheat crops ultimately harvested for grain were placed in the following fields:—"Flett's," "Nottle's," and "Ebsary's B." In addition to the above must be included the wheat plots of the Permanent Experiment Field and depth of ploughing tests at "Grainger's."

"FLETT'S."

This field, which is 178 acres in area, carried several large blocks of wheat, together with our hand selection plots and special seed plots. This field made magnificent growth, and, apart from a few patches of takeall and charlock, looked promising right down to harvest-time. In the end, however, no field on the farm suffered more from the prolonged and extreme heat of November; the grain at the time was in most varieties in the soft dough stage, and shrivelled away under the scorching influence of the sun's rays, just as if the crop had been badly affected by a late attack of red rust. And when at harvest time we came to thresh out the grain the great bulk of it ran out into seconds, and as such was not marketable. Of all the varieties tested

in this field Comeback alone appeared to be able to withstand these adverse conditions. I append below in Table XII. a statement of the bushel weights of the varieties grown in large blocks in "Flett's." An examination of the table will serve to show how much an unusual spell of hot weather at ripening time may serve to injure the sample of a well-grown crop of wheat.

TABLE XII.—*Showing Bushel Weights of Varieties of Wheat grown in Large Blocks in Flett's, 1911.*

Variety.	Bushel Weight.
King's White, selection 5	60lbs.
King's Red, selection 5	62½lbs.
King's Red, selection 4	61½lbs.
Bearded Gluyas, selection 5	61½lbs.
Late Gluyas, selection 5	59½lbs.
Gluyas, selection 4	62lbs.
Comeback, selection 2	66lbs.

The past history of this field may be summarised as follows :—1902, purchased and fallowed; 1903, wheat; 1904, bare fallow; 1905, wheat; 1906, pasture; 1907, bare fallow; 1908, wheat; 1909, pasture; 1910, bare fallow; 1911, wheat, &c.

This field was fallowed between June 25th and August 14th, 1910. The large blocks were sown between the 22nd and the 31st of May with 2cwts. of 36/38 superphosphate. The yields of the larger plots are shown in Table XIII.

TABLE XIII.—*Showing Yields of Large Plots of Wheat in Flett's—1911.*

Variety.	Selection.	Date of Sowing.	Seed per Acre.	Yields per Acre.
			lbs.	Bush. lbs.
Late Gluyas	5th ..	May 24 ..	84 ..	20 16
College Comeback ..	3rd ..	May 22-24 ..	78 ..	15 15
Bearded Gluyas....	5th ..	May 27-29 ..	92 ..	14 7
Gluyas	4th ..	May 29-31 ..	90 ..	14 0
King's Red	5th ..	May 24-26 ..	82 ..	13 57
Kings Red	4th ..	May 27-31 ..	82 ..	10 9
King's White	5th ..	May 26-27 ..	82 ..	8 18

The block of Gluyas of the 4th selection, 24.73 acres in area, was divided up into four plots a little over six acres each, to illustrate the results of the spring working of cereals. Plot 1 was left untreated; plot 2 was rolled and harrowed on July 6th; plot 3 was harrowed on July 5th and 6th; and plot 4 was rolled on July 5th. During the course of the whole season no outward difference could be detected in any of the plots; full harvest results are shown below in Table XIV.

TABLE XIV.—*Showing Harvest Results of Plots of Gluyas variously treated in Spring.*

Plot.	Treatment.	Yield per Acre.	Grain.
		Total Produce.	Bush. lbs.
		Tons. cwt. lbs.	
1.....	Untreated.....	1 14 8	16 8
2.....	Harrowed and rolled	1 6 45	13 24
3.....	Harrowed	1 8 67	12 37
4.....	Rolled	1 9 101	13 20

Thus it will be noted that on the whole the harvest results showed best, both in total produce and grain, from the plot which received no spring treatment whatsoever. It should not be forgotten, however, that this represents the results of a single season, to which too much importance should not be attached. I propose repeating these tests in coming years.

In addition to the larger blocks of wheat, returns from which have been indicated in Table XIII., we had in Flett's several small plots, the harvest results of which are indicated below in Table XV.

TABLE XV.—*Showing Harvest Results from Small Plots of Wheat in Flett's.*

Variety.	Observations.	Yield	
		Area. Acres.	per Acre. Bush. lbs.
Crossbred, No. 53 ...	Western Australian wheat—slightly spotted with rust; takeall	0.55	11 29
Cape Wheat	Selection 2—Late French wheat, slightly affected by red rust and flag smut; takeall	0.12	5 8
Queen Fan	New College wheat—Flag slightly spotted with rust; takeall	0.11	22 25
Federation	Selection 3—Affected by rust and flag smut; takeall	0.34	11 52
Jonathan	Selection 3—Flag spotted with rust; takeall	0.34	10 26
Carmichael's Eclipse .	Selection 4—Flag fairly rusty; takeall	0.16	16 53
Marshall's No. 3A ...	Selection 4—Flag spotted with rust; takeall	0.32	13 54
Marshall's No. 3B ...	Selection 4—Flag spotted with rust; takeall	0.28	7 37
College Eclipse	Selection 4—Flag spotted with rust; takeall	0.32	12 27
Late Gluyas	Selection 6—Flag spotted with rust; takeall	0.45	14 4
Wilmington	Selection 1—Flag spotted with rust; takeall	0.12	15 0
Viking	Selection 3—Flag fairly rusty; takeall	0.20	13 35
Bobs	Flag just touches with rust; a little flag smut	0.15	7 40
Unknown E.	Flag touched with rust	0.25	6 16
Sutton's Prolific	Flag spotted with rust	0.24	6 3
College Comeback ...	Selection 4—Flag just touched by rust; badly affected with takeall	0.31	8 4
Gluyas	Selection 6—Flag spotted with rust, a little flag smut, and takeall	0.72	8 34
King's Red	Selection 6—Flag and sheath rusty; heads slightly rusty; takeall	0.47	12 37
Combination	Marshall's—Flag spotted with rust; takeall	0.50	10 0
Unity	Marshall's—Flag just spotted with rust; takeall	0.49	8 2
Prolific	Marshall's—Flag rusty; takeall	0.47	17 3
Dorath	Marshall's—Flag rusty; takeall	0.47	17 33
Unification	Marshall's—Flag rusty; takeall	0.47	11 46

TABLE XV.—(Continued).

Variety.	Observations.	Yield	
		Area. Acres.	per Acre. Bush. lbs.
Pride	Marshall's—Flag spotted with rust..	0.46	12 13
King's White	Selection 6—Flag and sheath rusty; takeall	0.41	17 0
Bearded Gluyas	Selection 6—Flag and sheath rusty; takeall	0.36	14 38
Petatz Surprise	Flag spotted with rust; takeall.....	0.49	11 20
King Fan	Selection 2—New College wheat; flag just spotted with rust; takeall	0.08	8 33
Adjini	Flinty Tunisian wheat; takeall	0.48	10 54
Mahmoudi	Flinty Algerian wheat; takeall.....	0.96	11 50
Dymenos	Early Greek wheat; takeall	0.36	9 54
Egyptian wheat	Flinty—Flag spotted with rust; takeall	0.26	9 14

Unfortunately, the various plots of wheat the harvest results of which are given above in Table XV., were both badly affected with takeall and charlock. Of all these varieties, however, a new crossbred wheat of our own—Queen Fan—stood out well in its ability to crowd out weeds. We are inclined to think well of this wheat, but cannot guarantee it until it has stood the test of several seasons.

Before leaving this field it may be stated that to us it proved a most disappointing field; it looked magnificent right down to the beginning of November, and we expected from it yields between 20bush. and 30bush. In the end, instead of raising our general average, as we anticipated, it has only served to drag it down.

"NOTTLE'S" B.

It has already been stated that the great bulk of this field, which was originally intended for grain, was eventually cut out for hay. Its past history is summarised below :—1897, purchased and fallowed; 1898, wheat; 1899, wheat; 1900, bare fallow; 1901, wheat; 1902, pasture; 1903, bare fallow; 1904, wheat; 1905, bare fallow; 1906, wheat and barley; 1907, pasture; 1908, bare fallow; 1909, wheat and oats; 1910, bare fallow; 1911, wheat, oats, and beans.

The small portion of this field left ultimately for wheat was fallowed in September and October of the preceding year. The seed was drilled in with 2cwts. of 36/38 superphosphate. Harvest results are shown below in Table XVI. :—

TABLE XVI.—Showing Grain Harvest Results in Nottle's B, 1911.

Variety.	Selection.	Area. Acres.	Date of Sowing.	Seed per	
				Acres. Lbs.	Yields per Acre. Bush. lbs.
College Eclipse.....	3rd	2.08	May 15-16	78	16 10
Marshall's No. 3B	3rd	7.82	" 12-13	82	15 38
Queen Fan	1st	1.77	" 13-15	88	14 45
Carmichael's Eclipse ..	3rd	1.76	" 18-19	88	12 20
King Fan	1st	1.63	" 8	88	11 37
Jonathan	2nd	1.99	" 5-6	77	11 37
Marshall's No. 3A	3rd	5.28	" 11-12	82	11 23
Huguenot	—	2.27	" 8	85	9 53
Fan	5th	0.97	" 20	85	8 45

At no time did this field present a particularly promising appearance; hence, contrary to what was the case in Flett's, the comparatively low yields were not unexpected. It should be noted that all varieties sown before May the 12th were sown unpickled in dry conditions of soil.

EBSARY'S B.

The past history of this field has already been given when dealing with the barley crops which it also carried; it will be sufficient to recall that it was fallowed in 1910 between August the 20th and September the 10th. Portion of this field was also cut for hay; the balance, 20·03 acres in area, had been sown to Gluyas of the fourth selection on June 1st to 3rd, at the rate of 90lbs. of seed to the acre with 2cwts. of 36/38 superphosphate. This crop, being sown late, was exceptionally clean, and yielded ultimately 19bush. 31lbs. to the acre.

PLOTS OF THE PERMANENT EXPERIMENT FIELD.

This field, which comprises a regular series of two-acre plots, is always dealt with separately in a report of its own. It will be sufficient to state, therefore, that the field comprised 48·21 acres under wheat, which yielded at the rate of 16bush. 53lbs.

DEPTH OF PLOUGHING TESTS IN "GRAINGER'S."

In 1910 I started a series of one-acre plots in the recently purchased farm known as "Grainger's," with the object of testing the influence of the depth of ploughing on the growth and yield of wheat. I propose continuing these plots for a series of years, testing at the same time the amount of moisture to be found in these various plots at different depths. Personally, I do not attach much importance to the results of a single season. Visitors to the institution, however, have at various times expressed interest in these experiments, and I think it well therefore to indicate the results of the present season for the satisfaction of those who saw the growing crops. The data are summarised in Table XVII.

TABLE XVII.—*Showing Harvest Results from Wheat Fallowed at Various Depths in "Grainger's" in 1911.*

No. of Plot.	Depth of Ploughing. Inches.	Total Produce.			Percentage		Grain.	Percentage		Ratio of Straw
					Below Highest Plot, No. 7.	Highest		Below Highest Plot, No. 7.	Highest	
		Tons	cwts.	lbs.	Per cent.	Bush.	lbs.	Per cent.		60lbs. of Grain.
1	2	1	18	94	16·8	19	34	31·1		162
3	4	2	3	84	6·3	27	10	4·3		120
5	6	2	3	109	5·8	25	29	10·2		133
7	8	2	6	78	—	28	23	—		124
9	10	2	4	72	4·4	27	23	3·5		123
11	12	2	6	58	0·4	26	32	6·5		136

These six-acre plots were broken up to the depths indicated in the second column between July 8th and August 10th, 1910. For the purpose we made use of a single-furrow plough, and regularly checked the depth at each furrow. On May 22nd and 23rd King's White, of the fourth selection, was drilled in at the rate of 80lbs. to the acre with 2cwts. of 36/38 superphosphate. All

plots germinated regularly on June 3rd and 4th. They all came into bloom on September 20th and 21st, with the exception of plot 11, which did not bloom until the 26th. All plots ripened off at the same time, viz., on November 8th and 9th. From spring onwards plot 9, ploughed 10in. deep, had the most promising appearance; eventually, however, plot 7, ploughed 8in. deep, returned the highest yields of both total produce and grain.

I do not think that the results of a single season justify the drawing of conclusions on the subject. I, therefore, submit Table XVII. without further comment for the benefit of those who saw the standing crops. I may be permitted the remark, however, that in this case deep ploughing does not appear to have ruined the land, as some affect to believe to be invariably the case; indeed, it appears to have been responsible for appreciably higher returns both as grain and as hay. It should be stated that the land in question is what may be described as heavy clay loam seated on clay bottom. Arrangements have been made to conduct similar experiments from year to year.

GENERAL WHEAT AVERAGE ON THE FARM.

It remains for us now to determine what was the general average yield of wheat on the farm in 1911.

From 234.98 acres we harvested 3,355 bush. 56lbs., representing an average yield to the acre of 14 bush. 17lbs., which, with the exception of 1907, is the lowest average yield on our records since 1904. This disappointingly low yield is not so much the result of a low "useful rainfall," as the consequence of the unseasonably hot weather in November, which completely blighted off our most promising wheat field. I append (below) in Table XVIII. a list of the recorded yields of previous seasons:—

TABLE XVIII.—*Showing Average Wheat Yields on the College Farm, 1904-11.*

Year.	Rainfall.		Area Under Wheat. Acres.	Average Yield per Acre.	
	"Useful" Inches.	Total Inches.		Bush.	lbs.
1904	11.60	14.70	330.00	18	3
1905	14.23	16.71	212.00	24	11
1906	16.30	19.72	318.00	14	30
1907	13.81	15.05	178.00	13	20
1908	15.53	17.74	258.52	22	14
1909	21.15	23.05	328.47	25	5
1910	16.79	23.87	267.35	16	38
1911	8.19	12.42	234.98	14	17
Average yield of eight years	—	—	—	18	32



POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert.

POULTRY DISEASES.

Numerous cases of sickness among poultry have been reported to me, and on examination of either birds or premises the trouble was clearly traced to poultry ticks. If fowls become sick the owner would save much time and trouble if he would carefully examine both birds and roosting-houses. Pepper trees and paling fences are favorite harbors for poultry ticks, and also for other varieties of vermin. If there are any ticks present they must be destroyed before any hope of saving the balance of the fowls can be entertained. Special perches and other patents to prevent the ticks from reaching the fowls were useful in the old days, when poultry ticks were not included under the Stock Diseases Act regulations. The proper method now is to eradicate the tick. When this is done there will be no need to have recourse to patent perches, &c.

CHICKENPOX.

A disease, the origin of which is in dispute, is chickenpox. This for many years has been present during the latter part of summer and autumn. Sometimes the outbreaks are of a mild nature, and beyond being temporarily incommoded, the birds suffer but little harm. In other cases the attack is more general and is of extreme virulence. It is not infrequently associated with "roup," the fancier's name for a group of diseases, including diphtheria. The initial signs of an outbreak of chickenpox generally escape notice. At first a few pimples, or vesicles, appear on the comb or wattles. Even if noticed they are generally put down to the result of a peck, or to injury from wire netting. Later on a yellow head may form, and in the meantime numerous other pimples have appeared. If neglected, these will slough and join together, forming a large sore. The eyelids are frequently the seat of one or more pimples, which cause temporary blindness, and, in the case of chickens especially, death from starvation will result. In some localities much mortality has resulted.

Treatment.—Isolate all affected birds as soon as noticed. It is important to note that this disease is communicable to human beings. I have seen cases where the poultry-keeper's eyelids have become affected. Children should be kept from the poultry hospital. The attendant should carefully wash his hands in strong disinfectant after handling the birds, and all rags, etc., used should be burnt at once. Mix a small quantity of vinegar with

an equal bulk of water. Obtain from a chemist some carbolised glycerine, which is made by adding one teaspoonful of No. 2 carbolic acid (95 per cent.) to 14 teaspoonfuls of glycerine (1 in 15, or 16.6 per cent.). Bathe the comb, wattles, and other affected parts with the vinegar and water; dry with a piece of soft rag, and then apply the carbolised glycerine, taking care that none enters the eyes and so causes pain to the bird. Repeat daily if necessary. Dissolve as much Epsom salts as will lie on a threepenny piece in water and mix with bran and pollard for the bird to eat. If unable to see, the bird should be fed with small pellets of the food.

The other non-infected fowls should be treated with Epsom salts. Dissolve in the water to be used for mixing the morning mash one packet for each 20 adults. Twice a week will do. It is advisable to apply the carbolised glycerine to the combs and wattles of all these birds as a preventive measure. On no account use any rag or cloth which was used for the affected birds. If these measures are promptly adopted, the outbreak will be checked and the affected birds will quickly recover.

It is probable that a close, humid state of the atmosphere, which is often the condition at this season, is favorable to the growth and distribution of the disease germs. It is certain that, during an outbreak, any bird suffering from abrasions of the comb or wattles will develop the disease. The broken skin offers a means of entrance to the disease germs. Mosquitoes, in many localities, attack the sleeping fowls, and the punctures caused by their bites become sources of infection. A light spraying at night with a 10 per cent. solution of kerosine and soapsuds, if applied to all parts inside the roosting-houses, will generally drive the mosquitoes away.

During the moulting season the birds are often neglected and are ill-fed. They are not in robust health, and become a prey to the attacks of disease organisms. Thus roup may be associated with chickenpox, but it is not always present.

ENTRIES FOR 1912-13 LAYING COMPETITIONS.

A record number of entries has been received for the Roseworthy Competition, viz., 135 pens. Entries have come from all the States except Tasmania. New Zealand will be represented by two pens, and Victorian breeders to the number of 31 are anxious to test their birds. The test is of a genuine inter-State character.

For the Kybyolite test 34 pens have been entered, and as the test is limited to breeders in the South-East this must be regarded as highly satisfactory.

It is very probable that next year we may see competitors from England, and perhaps America.

OPERATIONS FOR MARCH.

TABLE POULTRY FOR EXPORT.

The export season for chickens will terminate on March 31st. Readers are referred to last month's notes (*Journal of Agriculture*, page 72C) for details. Those who have not read those notes are reminded that the prospects of good prices in London are again excellent. Breeders who have shipped in previous years are well satisfied and are again shipping. If you have not previously shipped, or so now, even if you have only half a dozen birds available. Forward them to the Manager, Government Freezing Works, Light Square, Adelaide, and mark them "For export." Should any not come up to standard a local sale at best obtainable price will be made, and the cash remitted to you. On any which are shipped you may, if you desire, obtain an advance; the balance will be paid to you on receipt of account sales from London. Further particulars on application to the Poultry Expert, Adelaide.

THE YOUNG STOCK.

Separate the sexes at an early date; this is essential to success. Of the cockerels, select and pen separately those which you intend to reserve. The balance should be fattened and forwarded for export or local sale. It does not pay to keep the cockerels too long, especially if they are Leghorns, as they become very quarrelsome and difficult to manage. The pullets should be graded to size; each lot kept separately. If large and small are running together the smaller and weaker ones are trodden under foot and are also robbed of their food; thus they fail to thrive. It should be remembered that on the proper rearing and feeding of the pullets the future egg production and, perhaps, stock (chickens) depend. Feed the pullets well, but do not force them; do not give too much animal food, and avoid the use of cut green bone, unless perfectly sweet and freshly cut; it is better given in the cooked state. Give as much variety in the food as possible. If you have a small mill, grind up wheat, oats, barley, maize, peas, &c., and make your mash from a mixture of these. These grains may also be fed whole. Green food is essential to success. Most foods are deficient in mineral salts; this lack can be remedied by plentiful supplies of succulent green food. If you have no green food sow wheat, oats, &c., in shallow boxes of rich soil; keep in the shade and water well. Maize sown thickly in small beds of rich soil and well watered will supply a lot of green food.

A SUPPLY OF GREEN FOOD.

In beds of rich soil sow Thousand-headed and Jersey tree kail for planting out with the first rains. Prepare ground for rape, mustard, barley, rye, &c., all of which give heavy crops of valuable green fodder. As a rule breeders

do not use anything like as much green food as they should; some do not use any. For farmers in all parts rye will be found excellent, as it grows in any soil and gives many cuttings.

AUTUMN BREEDING.

For a great many years I have advised breeders to begin hatching in March. Those who breed for exhibition only are not concerned, as July, August, and September are the months which suit their purpose. It is frequently stated that pullets of laying breeds hatched at this season moult twice; others say they moult late, with the result that there are no autumn or winter eggs. That has not been my experience. On the other hand, it may be pointed out that the pullets in each year's laying competitions are hatched at the conventional spring periods. With few exceptions all the pens have moulted out of season during the last three competitions. Many breeders have followed my advice with excellent results, and are now advocating the method. Where laying breeds are concerned the pullets have a long period of growth, with good development, during the cool weather, and they are strong and lay well, and can be used when 15 months old for breeding from in the spring. Table birds bred at this period are available when good chickens are scarce and command fancy prices. The white diarrhoea disease, which has been so fatal to chickens hatched in September and October of recent years, does not appear to be prevalent in autumn and winter. This is a strong argument in favor of the proposal.

BREEDS TO KEEP.

Those who wish to obtain fresh stock, or who are about to begin poultry-keeping, should lose no time in selecting their birds. Buy only the best, and go only to reliable breeders. The principal breeders of utility stock have entered hens in the laying competitions. Their names are published every week; write to some of them. It is better to start with three good birds than with twenty second raters.

For Egg Production select White Leghorns, unless you know some reliable breeder who has some good Brown Leghorns. Black Minorcas lay very large eggs, and some strains lay well. The show strain is not distinguished by high egg production. South Australian White Leghorns are the best in the world, but this statement refers to the property of experienced breeders. Good stock naturally costs money. You cannot buy good breeding stock at the price of culls or table birds.

For Table Birds select Wyandottes, Black Orpingtons, Buff Orpingtons; the hens of these lay well, as may be seen on reference to the published scores of the competitions. Stipulate, however, for birds laying a 2-oz. egg. These may be bred pure, or the hens may be mated with old English Game, or Indian Game male birds. In this case you must sell all the progeny, as

the crossbred pullets are seldom good layers. Plymouth Rocks are becoming great favorites and are good for both egg production and for table, but you must get the right sort. Favercrolles should be bred in great numbers, especially for the table.

DUCKS.

There is a splendid market in Adelaide during November, December, and part of January. After that ducklings may be exported until the end of February, and will realise good prices. Breed only those with white plumage and which are large, *e.g.*, Pekins or Aylesbury, or cross them. There is but a poor market for duck eggs in bulk, and for that reason the hardy, great laying Indian Runners cannot be recommended. The poulterers do not like them as table birds, and they are not suited for export.

YARDS AND HOUSES.

Many people write to me upon this subject. They are reminded that the question is fully treated in my "Poultry Manual," which contains illustrations. It is obtainable from the Government Printer, Adelaide, for the small sum of 7d. posted. If, after perusing the Manual, further information is required, it will be supplied upon application. For winter egg production the scratching shed house will give splendid results.

FIGURES AND PRICES.

England imports annually eggs and poultry valued at over £8,000,000; Germany, £10,000,000. The poultry products of the United States are annually valued at £200,000,000. South Australian poultry products (eggs and birds) are valued at about £650,000. The average annual price paid by England for eggs has risen from 6s. 2d. per 120 eggs in 1900 to 8s. 2½d. per 120 eggs in 1911. All over the world the price of eggs is rising. The general prosperity and improved food conditions are causing a great consumption of eggs and poultry, and countries which once exported largely are now only able to supply home requirements. It is doubtful if any industry other than the poultry industry has such splendid prospects of increasing prices and expanding markets. During the lean years of drought and poor crops the poultry kept many a family in comfort. By the adoption of modern breeds and methods others can live in comfort and even comparative affluence. Representative traders in Adelaide tell me that what is required is a vast increase in production. With 10 times as many available eggs and table birds the outside markets could be exploited with great advantage to the producer.

IRRIGATION AND RECLAMATION.

WORK ACCOMPLISHED AND CONTEMPLATED.

By S. McINTOSH, Director of Irrigation.

In view of the numerous inquiries from persons more or less interested in the irrigation and reclamation movement, the following brief outline of irrigation history of the State, with a list of existing and prospective irrigation and reclamation areas, is submitted. The information concerning Renmark, the pioneer irrigation district, is mainly compiled from the columns of the local press, to whom we are indebted.

The particulars of the majority of the prospective areas are adopted from a valuable report by the present Railways Commissioner, who was then Engineer-in-Chief; it is dated 1897, but information applies to the present position of affairs.

IRRIGATION.

The birth of practical irrigation in South Australia dates from the advent of the late Chaffey Bros., at Renmark, in 1887. Previously a number of our progressive settlers had practised the aid of artificial watering, but not on an extensive or properly established system.

The pioneer firm of irrigators were practical Americans, hailing originally from Canada, afterwards migrating to California, where they established successfully two irrigation settlements in Etiwanda and Ontario. These eminent irrigationists were sanguine as to the great future possibilities to be derived from the artificial application of water as the prime factor in successful cultivation, and the closer settlement movement of our semi-arid country along the banks of the Murray wherever the water supply was sufficient to meet such requirements.

As in every great movement, initial mistakes were made, but the optimism of these promoters of irrigation never flagged, despite the army of pessimists they had to contend with. The results of to-day amply justify that optimistic spirit, and the State is now awakening to the true value of its irrigation inheritance.

Ten years ago national irrigation in the arid and semi-arid States of America was a dream of the distant future—to-day it is a pronounced fact. Country which was considered as desert—as hopeless as the Sahara in one sense of the term—with the successful and economical application of water now supports tens of thousands of prosperous settlers.

South Australia does not aspire to extensive irrigation areas, but there is room for many lesser schemes apart from those along the Murray Valley.

Scattered over our dry and semi-arid districts, wherever natural waters are available, as at Pekina, we possess quite a number of areas, ranging from a few hundreds up to several thousand acres in extent, which could be profitably irrigated by the gravitation system from headworks. Artesian water supplies also promise a large share in the prosperous occupation of considerable areas of at present practically worthless country wherever the quality of the water is suitable. At present very valuable and interesting experiments are being carried out by the New South Wales authorities and others in the neutralising of the injurious alkalis contained in some of their artesian flows, and we are sanguine that practical scientific research work in this direction will, at a no great distant period of time, enable us to profitably and successfully use water which at present contains such an excess quantity of certain solids as to render it positively dangerous to plant life. Still, we have many instances of artesian water being used with success in the growth of fruit trees, vines, date palms, and fodders. Fruit from the date plantations at Hergott Springs is at present being sold in Adelaide, and its quality compares more than favorably with the very best imported article, while the price is within the reach of all. We have room for very considerable areas of this valuable product, and there is no doubt as to the market in this direction for years to come; in fact, as population increases so will the demand for this (when grown in South Australia) clean, wholesome, and popular fruit.

Lucerne and fodder grasses can be produced in abundance on our dry lands with the judicious use of water; and country at present carrying not more than a sheep to five acres or 10 acres rendered capable of successfully grazing from 15 to 20 sheep to the acre. The value of such irrigated pastures is the better realised and appreciated during periods of drought, when thousands of stock, which would under natural conditions perish, can then either be carried over the lean years or fattened and marketed with a higher margin of profit to the owner.

RENMARK.

Renmark, which came into existence in 1887, has now a population of about 2,000. It is situated on the Murray River, 351 miles from the mouth by river, 174 miles above Morgan, 43 river miles below the Victorian border, and 265 miles below the junction of the Darling River with the Murray at Wentworth. By land Renmark is 75 miles from Morgan, the nearest railway terminus, and 179 miles by rail and road from Adelaide. Renmark is an irrigation colony, and was founded under the Chaffey Brs.' Irrigation Works Act of 1887. Since 1897 the irrigation works have been administered by the Renmark Irrigation Trust, No. 1, a body elected periodically from among themselves by the ratepayers of the settlement. The original grant of land to Chaffey Brs. comprised 250,000 acres, and extended to the New South Wales border. In 1902 the area actually controlled by the Irrigation Trust

was reduced to 13,348 acres; but in addition to this 15,652 acres have been dedicated to the trust for commonage purposes. Renmark—now recognised, together with the sister settlement of Mildura, as one of the most successful irrigation settlements in the world—is the outcome of the enterprise and energy of Messrs. Chaffey Bros. The early settlers paid from £20 to £25 an acre for uncleared land with attached water right, believing that the efficiency of the pumping service was guaranteed by the Government. The failure of the promoters left the works in a very unsatisfactory state. In 1896 and 1900 loans of £3,000 and £16,000, respectively, were granted by the Government to enable the trust to put the machinery and channels into a state of efficiency. This money is now being paid in half-yearly instalments of principal and interest. The following table will serve to illustrate the gradual progress of the settlement to its present satisfactory condition:—

Year.	Acres Irrigated.	Estimated Value of Produce. £
1896	2,700 ..	6,878
1897	2,800 ..	16,869
1898	3,200 ..	11,968
1899	3,200 ..	18,167
1900	3,200 ..	22,036
1901	3,200 ..	28,167
1902	3,250 ..	35,000
1903	3,300 ..	39,250
1904	3,500 ..	40,250
1905	3,700 ..	41,550
1906	3,838 ..	52,000
1907	3,860 ..	85,000
1908	4,182 ..	60,000
1909	4,900 ..	85,000
1910	4,993 ..	100,000
1911	5,157 ..	100,000

The following are the figures for the dried fruits in Renmark during 1909 and 1910:—

	1910.	1909.
Apricots	162 tons ..	74½ tons
Peaches	28 " ..	25 "
Nectarines	3 " ..	2 "
Pears	8 " ..	9 "
Currants	501 " ..	257 "
Sultanas	471 " ..	445 "
Malagas	12 " ..	—
Lexias	614 " ..	610 "
London Layers	6 " ..	1 "

Renmark has now about 5,000 acres of irrigated land which previous to 1887 would not carry more than 2,000 sheep during the most favorable season. Water is here pumped from the river at a cost of 1d. per 19,000galls., and is delivered on the irrigation level through a second pump at a cost not exceeding a penny for 9,000galls. The annual average irrigation requirements along the river settlements is from 20 to 30 acre-inches per acre. The cost of pumping the necessary water for irrigation purposes on the majority of the settlements with the higher irrigation lands averages from 30s. to 40s. per acre per annum.

At BERRI, 26 miles below Renmark by river, 33 blocks of irrigable land, comprising 780 acres, have been allotted, and a further 50 blocks will shortly be available. An area of $79\frac{1}{2}$ acres has been set apart for irrigation experimental work to assist in securing the highest results from the river lands. The site includes all classes of soil common to the Murray Valley. It is intended to carry on fairly extensive trials with fruit trees and vines of new and approved marketable varieties, fodders, and other economic plants, and no doubt many valuable lessons will result. A dry-farming plot of $157\frac{1}{2}$ acres is attached to the irrigation farm, the former being above the line of water command. Water is to be supplied throughout this area to the different blocklers from Grant-Mitchell meters.

WAIKERIE and RAMCO are situated 36 miles above Morgan. This district has a total area of 7,890 acres, of which 1,900 acres are under irrigation.

KINGSTON, nine miles up river from Overland Corner, consists of 3,900 acres, of which 136 acres are irrigated. It is proposed to increase the irrigation area to 500 acres.

At MOOROOK a survey has recently been made, with the object of considering a proposal to irrigate a further 500 acres.

NEW ERA Government irrigation block has an area of 2,259 acres now in course of survey, of which approximately 1,000 acres are suited for successful irrigation.

LAKE BONNEY (now known as Cobdogla) is under survey at present, and we may look forward at no great distant date to see one continuous irrigation district from Overland Corner to beyond Renmark, with the bulk of the back lands above the irrigation contours and within reasonable distance of the frontage utilised for dry farming purposes. It can be run in connection with the irrigation blocks, thus ensuring a safe and profitable occupation by the right class of settlers.

LYRUP SETTLEMENT has a total area of 4,919 acres, of which 556 acres are irrigated. The population is about 140. It is situated 20 miles down river from Renmark.

Private irrigation settlements along the river include Murtho, with a pumping plant capable of delivering 48,000galls. per hour. W. Lewis, of Gurra Gurra, who, with his family, is making a splendid living from less

than 10 acres of irrigated land, which, under its natural condition would have starved a sheep, provides a splendid ocular demonstration as to the true value of irrigation when correctly practised.

The Pyap Proprietary Company holds about a thousand acres of soil well-adapted for artificial watering, and is already irrigating a considerable acreage of orchard and vineyard and for fodders. The highest level irrigated is 120ft., and the capacity of the plant 175,000galls. per hour.

Moorook, which was one of the original settlements, is most successful in its production of dried fruits, apricots in particular. Holder Estate, another ex village settlement, contains 6,900 acres, about 250 of which are being successfully irrigated.

Following Waikerie and Ramco down stream we next visit "Murray View," Messrs. Metters' property of 2,000 acres. They expected to have 65 acres of orchard and vineyard and 100 acres of lucerne under water command last season. The supply is pumped with three gas-producer plants, giving a joint capacity of 360,000galls. per hour. Mr. H. H. Dutton's estate, near Morgan, contains 19,000 acres, of which at least 650 acres can be profitably irrigated. At present 53 acres only are supplied with water, through the medium of a gas-producer plant, with a delivery of 180,000 galls. per hour. The North-West Bend Estate contains 2,422 acres, of which about 400 are under the water command; a further 500 acres could be irrigated with profit. Pumping plants, with a capacity of 407,500galls. have been erected. "Brenda Park," the property of S. Willcox, Esq., contains 10,438 acres, of which 1,000 acres are watered. The full-pumping plant has a capacity of 520,000galls. per hour. Both Brenda and North-West Bend consists partly of areas reclaimed against river floods, and at certain seasons of the year can be irrigated from sluice gates by gravitation from the river. A number of other irrigation farms and plots are to be found along the river banks throughout its length.

With judicious cultivation and irrigation crops of 2 tons of currants and raisins per acre are no exception. Lucerne crops yield up to 12 tons of dry or 36 tons of green fodder per acre, while with systematic grazing from 10 to 30 sheep per acre can be carried at a profit.

The village settlements were established on the river in 1894, mainly from the ranks of the then unemployed; unfortunately, human nature was not sufficiently far advanced to exist under the original scheme, which was on a *supposed* socialistic basis. As a result, a number of the weaker settlements, including New Era, Gillen, New Residence, Holder, and Pyap, were gradually eliminated. In 1899, after the exhaustive inquiry by a Royal Commission, the system was abolished, and the remaining settlers permitted to occupy independent leases, while the water was supplied on a co-operative basis, as at Renmark and elsewhere.

Murtho Settlement was commenced in 1894 on the lines of New Australia, but the theory did not work out in practice ; consequently the settlers disbanded in 1900, when the area was relet to a private individual.

Despite the fact that the village settlements did not turn out an unqualified success, the efforts of the Government of the day in the direction of furthering the irrigation movement resulted in the settlers in question demonstrating the value of the bulk of our river lands for wheat production, with the result that practically a new and particularly prosperous farming district is now firmly established on the banks of the Murray.

PARACHILNA AND PEKINA SCHEMES.

At PARACHILNA, in the north of the State, it is proposed to set apart a small plot of land during the coming season for irrigation experiments, with the effect of ascertaining by actual results the best fodders and plants to grow and the quantity of water required per acre to secure anything like maximum results.

PEKINA.—This scheme contains an irrigable area of 429 acres, divided into 45 blocks. The water is supplied through a main from the head works or reservoir. Each block is furnished with a meter, and at present a number of settlers are attempting the sprinkler system of irrigation, the practical result of which is extremely doubtful on areas of over an acre in extent.

An experimental block of 49½ acres has been established, on which the various methods of irrigation are being experimented with. Up to the present it has been demonstrated that land can be flooded within check rows on 3in., provided the soil has been properly cultivated before cropping. Thirty-six samples of lucerne seed are being tested, including an area of the recently imported Arabian variety, which is intended to be kept for the purpose of retaining this true and valuable strain. A number of grass experiments are also being conducted in addition to manure and cultivation test plots. The soil is a fine brown loam, containing a fairly high percentage of necessary plant foods and possessing a perfect drainage.

The quantity of water allowed is 12in. per annum. A further quantity per acre may be found necessary to give maximum yields of produce per acre.

Practically the whole area of the scheme will be devoted to raising fodders for assisting the dairying industry.

RECLAMATION AREAS.

What promises to be the most successful class of closer settlement in the State is on the reclaimed swamp and overflow lands of the Lower Murray. The valley of the River Murray contains approximately 250,000 acres of land of varying quality, all rich in organic matter, and the bulk of which may be utilised with a very decided margin of profit. The upper lands, in many places, can be either wholly or partly reclaimed, and when the river water

falls below the level to permit of gravitation irrigation, owing to the low lift, effective and economical pumping plants can supply the balance of water required for intense culture at a minimum cost. Firewood is to be had in abundance, and charcoal as a motive power can be produced at a low figure. The soils on the lower reaches of the river, of which there is a very considerable area that can be reclaimed, have proved, both from analyses and actual results, to be some of the richest in the known world. They are composed of layer upon layer of rich river silt, intermixed with immense bodies of decomposed vegetable (aquatic and semi-aquatic) growth, added to the droppings of fish, water birds, &c., and deposits of decayed animal matter, to a total depth, in many places in the Lower Murray, of over 40ft. There can be no possible shadow of doubt but where such lands as described are properly reclaimed against the inroads of flood waters and effectively drained they will become some of the most productive in Australia, and will hold their own with the best in the older countries of the world.

The overflow swamps of the Murray, from its discharge into Lake Alexandria up stream to Mannum, contains approximately 25,000 acres of the richest organic soils in Australia, proved by analyses, which have given the phenomenal result of 41,275lbs. nitrogen, 5,200lbs. phosphoric acid, and 39,325lbs. potash to the acre-foot (dried at 105 per cent.). Practical results include a crop of 30 tons of onions to the acre, grown by Messrs. H. W. Morphet & Co., of Woods Point; $3\frac{1}{2}$ tons of lucerne hay per acre from at least two local farms from one cut. The annual average lucerne hay crop is from 7 tons to 10 tons (the plant continues growing during winter), in addition to wonderful yields of malting barley, oats, mangolds, pumpkins, beans, &c.

The following list gives the respective areas reclaimed, with general particulars :—

1881.—Sir W. F. D. Jervois, of Wellington Station (then Governor of the colony), started with a low embankment and reclaimed 3,320 acres against ordinary river floods; partly sown with grasses, &c., and almost exclusively devoted to stock-grazing.

1882-1908.—Messrs. H. W. Morphet & Co., of Woods Point; area, approximately 1,000 acres. The first swamp, fully reclaimed in 1889, contains 650 acres, over one-half of which is continually cropped with lucerne, onions, English barley, &c., the first named predominating; the balance is at present used for grazing purposes. Besides carrying a large number of sheep, a dairy of 200 cows are milked.

1896.—The late Mr. A. Macfarlane, of Wellington Lodge, reclaimed over 700 acres at a cost exceeding £10,000. This land is now used for grazing, and carries a very heavy stocking.

1898.—Hon. J. Cowan, M.L.C., of Glen Lossie, reclaimed 800 acres,

part of which is used for intense culture, although the bulk of the area is devoted to stock-grazing.

1905.—Moblong Area, about 480 acres, was protected by the Government from the river overflow with the completion of a levee commenced in 1884. It is divided into 39 blocks, varying from 10 to 25 acres in extent. In this, as in all other reclaimed areas, wherever the naturally-drained lands are cropped, splendid returns follow.

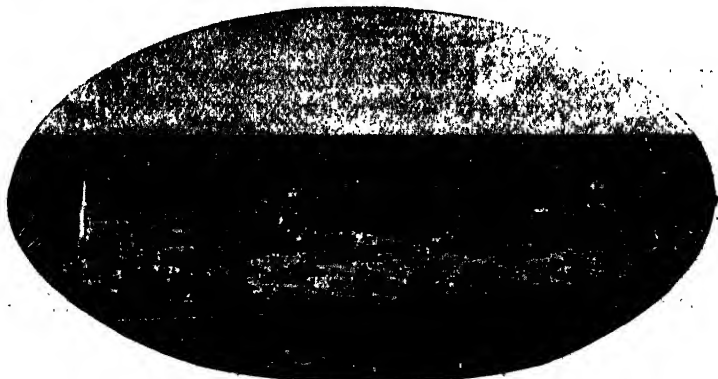
The Government Experimental Farm, which contains 40 acres, was established in 1906, with a view of assisting the settlers to successfully solve the problems of drainage and intense culture on this class of country and under the peculiar natural conditions obtaining. Up to the present many useful lessons have been learnt from the practical experiments conducted on the farm, and with the experience gained still better results may be expected in the near future. Dairying is the principal industry on Moblong as well as on the other areas reclaimed by the Government.

1905.—Burdett Area, 120 acres, was also reclaimed by the Government. It is divided into 17 blocks, all of which are occupied, and command a high premium, as do all other lands of this class.

1907.—Long Flat Area was added to the list by the Government. This covers 360 acres, subdivided into 20 blocks.

1909.—Monteith Area, of about 1,000 acres, was protected from the river overflow by the State, and allocated to 37 applicants. This is one of the richest swamp areas within the Murray Valley, and with proper management on the part of the owners will become one of the show places of Australia in the matter of crop and fodder record yields per acre. Several other swamps of lesser areas than those enumerated have been partly reclaimed, whilst others (including Mypolonga, of nearly 2,000 acres) are being converted by the Government into rich and fertile estates.

Areas which will be reclaimed at an early date are—Pompoota, 600 acres; Wall Swamp, 700 acres; and Mypolonga, 1,833 acres irrigable, 4,355 acres of high land.



A Glimpse of Mount Gambier.

DISEASES OF FARM ANIMALS.

BY OFFICERS OF THE STOCK DEPARTMENT.

THE CIRCULATORY SYSTEM.

(Continued from page 648.)

For the purposes of this article the circulatory system will be taken to mean the heart and the veins and arteries of the horse. The blood flowing through them will not be dealt with here, as the diseases affecting it are, as a rule, distinct from those affecting the vessels through which it flows, and it is involved in the majority of diseases attacking the other tissues of the body.

It will be necessary for the sake of clearness to briefly outline the structure and functions of the pump which propels the blood through the vessels, and of those vessels themselves.

The heart is a hollow muscle, which starts pumping before birth and works uninterruptedly until some little time after death at an average rate of about 40 strokes a minute. It hangs in the chest supported by the large vessels which enter and leave it, suspended from the spine between the two lungs, with its point nearly touching the breastbone between the fifth and sixth ribs towards the near side, at which place its beat can be best felt or heard. The heart is usually described as being divided into four chambers, two of which belong to the so-called right heart and two to the left. The upper chambers are receiving-houses for blood, which passes through valves between them and the lower chambers into the latter, which are the pumping-houses sending it from the right heart to the lungs to be purified, and from the left to carry out its work throughout its body. The heart muscle and its valves are lined with a bright smooth membrane which may be described as consisting of microscopic polished tiles; similar cells also line the blood-vessels. The outside of the heart is covered in like manner, the membrane being continuous with that lining the double bag in which the heart is suspended, and between the folds of which is a small quantity of fluid to facilitate the movements of the heart and protect it from injury.

The impure, used-up blood from the various parts of the body enters the top of the right heart, passes through to the lower part, the contraction of which closes the valve between them and forces it into the lungs, where it

is purified and returns to the top of the left heart. It then passes through the valve into the lower chamber, the contraction of which closes the valve between them and forces the blood through the biggest blood-vessel in the body into the vessels which distribute it throughout the system. These are called "arteries," and those by which it is carried back to the heart are termed "veins." The arteries, in which, if they are compressed against an underlying bone, the wave of the pulse may be felt occurring on account of the blood wave forced from the heart, after death are found open and empty, for which reason old-time anatomists thought they conveyed air, and gave them their name, which means air vessels. They are lined with the same shining flat cells as the inside of the heart, and their coat is built up of layers of muscle and elastic tissue.

The vessels returning the blood—the veins, the blood-carriers of the old-time investigators—have a similar lining, but their coats are thinner, containing much less muscle and practically no elastic tissue. They, however, have a distinct characteristic in the valves which occur at intervals along their course; these are small saucer-shaped sacs, which prevent back flow of the blood.

As the arteries diminish they lose their strengthening coats, and at last become mere tubes of loosely connected cells, through which the blood finds its way into the substance of the tissues, and passes into similar cell tubes, which gradually become veins. It will be readily seen that any injury or damage to such delicate and never-resting organs will be fraught with most serious results to the animal, and yet Nature is so full of compensations that often the heart of a horse is found after death, from some other cause, to be affected with old-standing diseases. The various forms of heart disease require a trained veterinary surgeon to diagnose them, and it is not an easy matter for him to do so unless he is fully equipped with delicate instruments.

The more general symptoms of many forms of heart disease which are likely to strike an owner's eye are—loss of condition, varying appetite, weakness, especially after work or strenuous endeavor, such as shifting a heavy load or working against collar, profuse sweating on the least exertion, shortness of breath and cough, the latter being painful and suffocating, alteration in the rate and character of the pulse, sometimes very weak, rapid, and fluttering, at other times slow, overfull, and presenting a curious double beat or back lash. Careful comparison of the eyes will often reveal a marked difference in the size of the two pupils, and in advanced disease there is likely to be a dropsical swelling under the jaw and along the chest and belly, with similar soft swellings affecting the legs. In the earlier stages of many forms of heart disease the trained veterinarian is able to prescribe remedies which will alleviate and often cure, but in advanced disease the alleviation offered to the human being similarly suffering is out of the question for economic reasons alone, and the danger of the animal dying suddenly while at work makes it desirable to get rid of him. The most common forms of heart disease

in the horse produce a thinning and enlargement of the walls of the heart, and in this case, if the symptoms are not severe, a horse may do useful work for years without the condition being suspected. In such forms of disease good keep, steady and not severe work, and heart tonics, such as digitalis, are required.

Inflammatory thickening of the lining membrane of the heart and valves causes acute pain and disturbance, and growths form which prevent the valves from closing. A similar condition often causes the heart to adhere to its enclosing bag, and the pain and interference with its action soon reduce the animal to a feeble skeleton. Two forms of disease which affect the blood-vessels are aneurism and thrombosis. The former affects the walls and the latter causes a blocking of the channel, and often they are found interdependent on one another.

An aneurism is a bubble-like distension of the walls of the arteries arising from an injury to them. It may be experimentally shown by taking a length of rubber tube and distending it after slightly pricking its inner surface and closing the far end, when a balloon-like aneurism soon forms near the point of injury. This disease occurs somewhat frequently in racehorses in the large blood-vessel which leads away along the spine, and as there is a very considerable strain on this vessel it not infrequently ruptures, and the animal dies of internal bleeding.

Other injuries to the lining membrane of glistening cells cause the protruding ones to dam up the blood, which changes in nature and coagulates, causing a clot, which occludes the passage of the vessel, forming a thrombus. This form of disease is more common than the aneurism, and may frequently be seen in the arteries which supply the large bowels of the horse, being caused not by injury to the vessel itself, but by the mechanical blocking of the tube by the so-called bloodworms. The vessel frequently enlarges so as to allow the blood to pass, and this distension is generally spoken of as an aneurism, but from the above description it will be seen it is not. Of course, where there is only one artery supplying an organ its occlusion is a very serious matter, but it happens that there are many branches, both large and small, supplying the large bowels, and when one is stopped up a smaller branch gradually accommodates itself to the extra pressure and takes over the duty of the closed one. This is spoken of as collateral circulation, and occurs regularly in the vessels supplying the bowels, and even at times when the large vessels supplying the limbs are blocked up. This happens fairly frequently to the main artery supplying the hind leg, resulting in loss of power in the limb and extreme coldness of the surface. If the arm is passed up the rectum the pulse of this artery may be felt against the pelvis on either side, but when one is closed the pulse on that side cannot be found.

Varicose or distended veins in the legs are frequent in the human being on account of his upright carriage. They do not occur often in the legs of

the horse, but affect some of his internal organs, the soft structure of which, however, soon accommodates itself to the new condition. The allied disease, hæmorrhoids or piles, however, sometimes affects in-foal mares, which then require laxative and strengthening food, and if the disease is very severe Hamamelis, or witch hazel, are indicated both internally and locally.

Many other forms of disease affect the heart and blood-vessels of the horse, but they are not likely to be discovered without the aid of a qualified veterinary surgeon, and even if they were the treatment would be beyond the skill of the stockowner.



ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on February 14th, there being present Messrs. A. M. Dawkins (Chairman), C. J. Tuckwell, C. J. Valentine G. F. Cleland, J. W. Sandford, J. Miller, Professor Perkins, Col. Rowell, and G. G. Nicholls (Secretary).

FREIGHT ON CREAM, PORT LINCOLN TO PORT ADELAIDE.

A request from the Green Patch Branch, that the Board should endeavor to secure lower steamer freight and charges on cream between the above-mentioned ports, was fully considered. It was decided to recommend the Branch to get dairymen in the district to co-operate and send several cans of cream in one consignment and thus secure the lowest rate possible for the parcel. Small consignments proved very expensive on account of minimum charges for wharfage, &c.

VETERINARY SURGEONS.

A request from the Wilkawatt Branch, that the Board should endeavor to secure the appointment of a veterinary surgeon in the Pinnaroo district, was referred to the Minister of Agriculture for consideration.

NEW MEMBERS.

The following gentlemen were approved as members of the undermentioned Branches :—Messrs. S. Bennett, Warcowie; Rev. J. E. Cresswell, W. C. Whitbread, Keith; F. A. Johns, Port Pirie; J. Pearce, W. H. Pearce, C. E. Blackett, M. H. Blackett, Hooper; E. Jettner, Jas. Gray, W. Gray, Leighton; T. Jacobs, Cherry Gardens; E. G. Carvossa, Clarendon; B. Fidler, A. P. Herbertson, D. W. Wollaston, A. J. Bishop, Mount Barker; A. McCallum, C. E. Frost, Yabmana; S. Downing, Kanmantoo; W. M. Rumbelow, L. E. Mann, L. H. Mann, J. Critchley, W. H. L. Williams, F. Eatts, W. Richards, Narrung; R. D. Norris, E. W. Bussens, Paskeville; A. Stokes, Arden Vale and Wyacca; W. J. Sanderoock, Wirrega; Thos. Macklin, Tatiara; R. Pitman, L. R. Pitman, S. J. Purdie, Wirrega.

ANALYSES OF FERTILISERS.

The following are the results of analyses made by the Government Analyst of samples of fertilisers taken since the beginning of the year. The results, compared with the guarantees, may on the whole be considered satisfactory to the purchasers. They are published for general information.

Name.	Results of Analysis.			
	Phosphate.			Nitrogen.
	Water Soluble.	Citrate Soluble.	Acid Soluble.	
	Per cent.	Per cent.	Per cent.	Per cent.
Mt. Lyell Mining and Railway Co., Ltd.—				
Standard super.	39.93			
Guano super.	32.97	1.62	6.90	
Bone and super. No. 1	17.78	7.26	15.80	1.55
Adelaide Chemical and Fertiliser Co., Ltd.—				
Guano super.	33.71	1.27	5.83	
S.A. super.	34.23			
Super. B	18.53	17.74	3.94	
Mineral super.	35.63			
Bagot, Shakes, & Lewis, Ltd.—				
Japanese super.	40.76			

Name.	Registered Guarantee by Vendor.			
	Phosphate.			Nitrogen.
	Water Soluble.	Citrate Soluble.	Acid Soluble.	
	Per cent.	Per cent.	Per cent.	Per cent.
Mt. Lyell Mining and Railway Co., Ltd.—				
Standard super.	36.00			
Guano super.	25.00	5.00	8.00	
Bone and super. No. 1	18.50	5.36	17.24	1.50
Adelaide Chemical and Fertiliser Co., Ltd.—				
Guano super.	25.00	5.00	6.00	
S.A. super.	30.00			
Super. B	16.00	14.00	8.00	
Mineral super.	36.00			
Bagot, Shakes, & Lewis, Ltd.—				
Japanese super.	38.40			

GEO. QUINN, Inspector of Fertilisers.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started on April 1st, 1911, and to terminate March 31st, 1912.]

Competitor.	Eggs Laid for Month ended February 29th.	Total Eggs Laid from April 1st, 1911, to Feb. 29th, 1912.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS (except where otherwise noted).

The Range Poultry and Egg Farm, Toowoomba, Queensland.	110	1,162
Cosh, A. J., Normanville	96	1,153
Cowan Bros., Burwood, N.S.W.	103	1,138
Hamill, H., Kogarah Bay, Sydney	86	1,066
Rhodes, H. G., Brompton	62	830
Collings, O. A., Riverton	111	1,165
Hay, O., Normanville	93	1,147
Stevenson H., Port Melbourne, Victoria	87	971
Pope, F., jun., Rockleigh	87	839
Malthouse, James, Normanville	99	1,086
Moritz Bros., Kalangadoo	115	1,174
Whetstone & Knappstein, Clare	92	966
Lampe, Bert, Kadina, S.A.	91	980
Collings, O. A., Riverton	104	1,193
Bertelsmeier, C. B., Clare	117	1,167
Bond, A. J., Clare	94	973
Moritz Bros., Kalangadoo	118	1,076
Waite, F. J. Osborne, Nailsworth	87	936
Ellery, J., & Son, Clare	121	1,140
Kempster, T. E., Lilydale, Victoria	90	963
Kinnear, Mrs. A. E., Hyde Park	75	1,003
Steer, W. J., Port Pirie West	67	904
Fitz-Gerald, Gerald, Mordialloc, Victoria	92	1,028
Featherstone, Mrs. M. A., North Croydon	105	940
Lawson, Miss N., Lower Mitcham	78	994
Provis, Mrs. W., Eudunda	80	1,031
Steed, J. F. T., Woodville	77	1,070
Uren, Mrs. P. A., Kapunda	135	1,217
Oodling H., Mitcham Park	55	958
Provis, W., Eudunda	82	993
Pedder, E. A., Burnside	95	1,049
Tookington Park Poultry Farm, Grange	89	1,014
Swann, V. Roy, Jamestown	69	762
Miles, C. & H., Littlehampton	112	930
Wondatta Poultry Farm, Eudunda	93	701
Purvis, Master James, West Glenville	91	1,044
South Yan Yean Poultry Farm, South Yan Yean, Victoria	86	906
Sargenfr Poultry Yards, East Payneham	98	1,022
Masey, Phillip, Alberton	91	1,029
Pagman, A. H., Hyde Park	124	1,183
Hill Chas., Monarto South	97	946

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended February 29th.	Total Eggs Laid from April 1st, 1911, to Feb. 29th, 1912.
SECTION I.—LIGHT BREEDS—Continued.		
WHITE LEGHORNS (except where otherwise noted).		
Read, J. D., Springhurst, Victoria	97	986
Mildren, D., Clare	101	1,089
Eckermann, W. P., Eudunda	114	1,122
Hurford, E. W., Grangeville	104	1,160
Sargenfri Poultry Yards, East Payneham	98	1,019
Shepherd, R. H., Balaklava	89	1,021
Rice, J. E., Cottonville	105	1,047
Burden, H. P., Balaklava	94	1,053
South Yan Yean Poultry Farm, South Yan Yean, Victoria	99	1,075
Keddie, R. A., Woodside	45	983
Purvis, Miss Gracie, West Glanville	93	1,105
March, H. S., Kapunda	97	1,034
Mildren, D., Clare	110	1,061
Hill, Chas., Monarto South	43	858
Marshall, J. W., Moonta	107	1,074
Hollands, Iru, Moonta	117	1,083
Dyer, P., Woodville	107	1,082
Edgar, R., Moonta	85	1,088
Hocking, E. D., Kadina	110	907
Purvis, W., West Glanville	81	1,145
Carling, R., Kangaroo Flat	113	1,118
Howlett, H., Moonta	114	1,026
Addison, Mrs. A. L., Malvern	121	981
Menkens, F. H., Henley Beach	100	1,114
Haines, T. F., Fullarton Estate	115	988
James, Wm., Croydon	115	917
Pettigrove, T. A., Northcote, Victoria	106	1,026
Read, J. D., Springhurst, Victoria	97	843
Riordan, D., Kent Town	100	898
Kappler Bros., Marion	102	1,011
Bertelsmeier, C. B., Clare	114	1,109
"Koonoowarra," Enfield	111	1,024
Marron & Smith, Prospect	107	1,046
Connor, D. C., Gawler	61	996
Thistle Stud Poultry Farm, Quorn	109	1,038
Uren, P. A., Kapunda	120	1,050
March, H. S., Kapunda	70	1,039
Navan Poultry Farm, Minlaton	63	807
Holmes, F. A., Frances	70	967
Lillywhite, R. G., Dulwich	78	992
Burden, Mrs. M., Islington	64	884
Coombes, E. L., Silvertown, N.S.W.	100	1,093
Curtis, G. R., Mitcham	98	966
Roche, Mrs. N., Middle Brighton, Victoria	70	776
Mitcheson, R. H., Prospect	104	1,081
Hannaford, F. E., Monteith	90	969
Belcher, P. A. S., Georgetown	83	861
Whitrow, A. J., Knoxville	100	1,026
"Eurinima," Kybybolite	90	816
Kalms, A. G., Eudunda	106	958
Counter, E., & Foreman, Hindmarsh	66	815
Morton, T. W., East Moonta	66	778
Hall, T. C., Rose Park	94	878

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended February 29th.	Total Eggs Laid from April 1st, 1911, to Feb. 29th, 1912.
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SECTION I.—LIGHT BREEDS—Continued.

WHITE LEGHORNS (except where otherwise noted).

Ontario Poultry Farm, Clarendon.....	113	958
Biggs, W. D., Hyde Park.....	103	1,024
Tomlinson, W., Clarence Park.....	75	885
Redfern Poultry Farm, Caulfield, Victoria.....	153	1,426
Sickert, P., Clarence Park.....	80	1,135
Bennett, W. C., Magill.....	91	1,077
Franklin, G., Kent Town (Minorcas).....	74	940

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTON.

Brundett, S., Moonee Ponds, Victoria.....	108	981
Phillips, A., Portland, S.A.	32	884
Cowan Bros., Burwood, N.S.W.	63	922
Hutton, O., Parkside.....	83	783
Bertelsmeier, C. B., Clare.....	69	708
Tockington Park Poultry Farm, Grange.....	54	820
Padman, J. E., Plympton.....	75	909
Killara Poultry Farm, Tyatt, Victoria.....	77	830
Martin, B. P., Unley Park.....	65	1,015
Francis Bros., Fullarton.....	68	893
Bertelsmeier, C. J., Clare.....	61	787
Padman, J. E., Plympton.....	59	852
Killara Poultry Farm, Tyatt, Victoria.....	80	971
McKenzie, E., Northcote, Victoria.....	48	990
Craig Bros., Hackney.....	72	1,109

BUFF ORPINGTON.

Ross, J. W., Somerton, via Glenelg.....	79	789
Hocart, F. W., Clarence Park.....	69	790

WHITE ORPINGTON.

Sykes & Harvey, Hamley Bridge.....	71	760
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SILVER WYANDOTTES.

Cant, E. V., Richmond.....	82	952
Kappler Bros., Marion.....	78	886
Burden, H. P., Balaklava.....	55	809
Redfern Poultry Farm, Caulfield, Victoria.....	75	754

LANGSHANS.

Stevens, E. F., Littlehampton.....	67	885
Jonas, H. D., Broken Hill.....	78	770
Toseland, Geo., Geranium.....	100	1,015

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended February 29th.	Total Eggs Laid from April 1st, 1911, to Feb. 29th, 1912.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS (except where otherwise noted).

Moritz Bros., Kalangadoo	122	1,351
Sudholz, Alf., Kalangadoo	102	921
Boyce, J., Kalangadoo	102	1,004
"Mahama," Mount Gambier	120	1,199
"Herdfield," Mount Gambier	107	1,111
Lewis, C., Bordertown	80	867
Staunton, S., Naracoorte	28	737
Lillywhite, R. G., Dulwich	50	920
Jarrad, J., Mount Gambier	112	1,120
Hall, C. W., Mount Gambier	115	1,079
Sargenfri Poultry Yards, East Payneham	109	1,076
Vorwerk, H. F. & A. C., Millicent	119	1,201
Lacey, F. C., Kybybolite	102	1,087
Kinnear, Mrs. A. E., Hyde Park	106	1,022
Rake, A., Kalangadoo	108	929
"Eurinima," Kybybolite	94	848
Smith, R. L., Hynam	93	835
Day, Mrs., Roseworthy	120	907
Scholz, C. H., Kybybolite	124	1,029
Purvis, W., West Glenville	100	1,053
Hannaford, Mrs. F. E., Monteith	104	1,000
Jenkins, Mrs. C. J. A., Kybybolite	94	975
Bertelsmeier, C. B., Clare	114	1,051
Navan Poultry Farm, Minlaton	101	843
Scholz, A. R., Kybybolite	100	912
Mohr, S., Tantanoola	97	979
Featherstone, Mrs. M. A., North Croydon	98	850
Toseland, G., Geranium	87	864
"Koonoowarra," Enfield	100	902
Palmer, W., Franklin Street, Adelaide	92	839
Cosh, A. J., Normanville	69	903
Queale, W., Lameroo	100	953
Tomlinson, W., Clarence Park	100	815
Reed, A. J., Pinnaroo	89	868

SECTION II.—HEAVY BREEDS.

SILVER WYANDOTTES.

McNamara, Mrs. D., Mount Gambier	71	774
Moritz Bros., Kalangadoo	31	616
Staunton, S., Naracoorte	54	701
Burton, H. P., Balaklava	54	779
Vorwerk, H. F. & A. C., Millicent	49	742
Viney, A. W., Bordertown	59	558

BLACK ORPINGTON.

Smith, W., Hynam	77	547
Phillips, A., Portland, S.A.	103	702
McNamara, Mrs. D., Mount Gambier	71	666
Bertelsmeier, C. B., Clare	47	545
Blue Lake Poultry Yards, Mount Gambier	23	741
Bail, H., Kaniva, Victoria	52	699

LANGSHANS.

Toseland, Geo., Geranium	92	865
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NOTES ON EGG-LAYING COMPETITIONS.

The laying is still satisfactory and the average will be equally so. The leading pen at Roseworthy, owned by the Redfern Poultry Farm, Caulfield, Victoria, has put in excellent work, viz., three weekly scores of 35 and one of 40, which is the highest for some time. Most of the birds are in some process of moulting; the general health is good. The position is naturally an open one, and much may happen before March 31st. However, my previous remarks have since been justified. I said there was no cause for alarm. That we have still good layers is evident by the performance of the leading pens at both Roseworthy and Kybybolite. All along I have pointed out that most of the pens are mixed in type; this is a matter for the breeders to rectify. It is to be hoped that in the coming competition the average pen will be made up of better layers.

ROSEWORTHY.

The Superintendent reports:—The general health of the birds has been good, all are looking well, majority showing bright and fresh comb, daily laying is on the increase—during the last two weeks slight and maintained. The laying for the month has also been consistent. The chief feature has been the good laying by the leading pen, which bids fair to beat the previous South Australian record. Three deaths in the heavy section and two in Section I.—five for the month—were caused by the excessive heat which prevailed on the last instant. Hotter days have been experienced since which have not affected the birds. The broody pens were occupied by 29 hens from 25 pens in Section I., and 50 from 21 pens in Section II. The average maximum temperature for the month has been 98° and average minimum 62·89°, with 10 days over the century in the shade, viz., from 100·2° to 117·8°, the first four days reading respectively 114·2°, 117·8°, 116·3°, and 117·8°, the latter being the highest reading, while 50·4° was the lowest. Rain fell on three days, totalling 34 points. Wind from light to strong blew on 26 days, chiefly from south-west and south-east. The birds are going through a general light moult.

KYBYBOLITE.

The Superintendent reports:—The laying has been about the same as last month and the moult does not seem to affect it. Providing that we do not have anything in the way of severe weather one pen ought to get within 20 of 1,500, which would compare favorably with last year's score. One hen was broody in Section I., and 22 in Section II., which is more than last month. The general health has been good and only one death was reported. The weather in the early part of the month was hot and dry, though since then we have had fairly mild weather and a few showers of rain. The maximum temperature was 113° and minimum 50°.

D. F. LAURIE, Poultry Expert and Lecturer.]



INDIAN WHEATS.

IMPROVEMENT AND PROBLEMS.

The Journal of the British Board of Agriculture contains the following comments on Bulletin 22 of the Indian Agricultural Research Institute dealing with the work being done at Pusa, with the object of improving Indian wheats :—

“ The researches of the authors—Mr. and Mrs. Albert Howard—have shown that there exist in India types of wheat nearly as suitable for milling and baking purposes as the well-known Manitoba Hard, which, on an average, is worth, in the home market, about 5s. a quarter more than the best British wheats. The superiority of the Canadian wheat lies in its ‘ strength ’—a technical term, which means that it produces larger and more shapely loaves than other varieties.

“ For many years the Indian cultivator—under a mistaken notion as to the requirements of this country—has been growing for export a weak wheat which, except for its remarkable dryness, has very little to recommend it to the miller. That the production of this weak wheat has been largely for export is apparent from the fact, ascertained by Mr. and Mrs. Howard, that for his own consumption the native of India much prefers a strong wheat of the Fife or Canadian type. With a view to providing a higher class wheat for export, the Pusa Institute has, for some years, been engaged in collecting stocks of suitable varieties, both by selection and by the new methods of breeding cereals which are being so successfully pursued at Cambridge by Professor Biffen. It appears from the bulletin under notice that success has been attained, so far at least as a portion of India is concerned. Wheats have been produced which, in the climate of Western Bengal, give not only a much higher yield than the native wheats, but also are characterised by great strength, and are therefore likely to command a higher price in the home markets than the wheats hitherto exported. The new wheats have been examined by one of the leading experts in milling in this country, and pronounced to be practically quite as good as the best Canadian.

“ An interesting feature of the work at Pusa is that it disproves a theory sometimes maintained by experts, viz., that it is impossible to combine high quality with good yield. It has been known for many years that the high quality Canadian wheats cannot be brought, by any system of cultivation, either in Canada or in Britain, to give as high yields as the low quality wheats

commonly grown in Britain, and it is sometimes maintained that low quality is a necessary result of the free yielding power of the favorite British wheats. The work at Pusa, however, confirms what has been established at Cambridge—that it is possible, by the scientific methods of breeding associated with the name of Mendel, to combine high quality with good yield. The results obtained last year with Burgoyne's Fife—a new Cambridge wheat—show that it gives a grain equalling the Canadian in milling quality, combined with the cropping capacity of the best British wheats.

“During the progress of their investigations, Mr. and Mrs. Howard made an important discovery in connection with the cultivation of wheat in India that may lead to results of the greatest economic importance. After harvesting his crops in March the Indian cultivator leaves the stubble untouched during the hot dry months of April and May, when the soil becomes so hard that it is hardly practicable to break it up with the native wooden plough. It is not till July, when the rainy season ordinarily begins, that the cultivator starts to prepare the land for the sowing of wheat in October. It has been found at Pusa that if the stubble be broken up immediately after harvest, and cultivated during the dry months, there is a great accession of fertility. By this means it has been found possible to grow crops of 40bush. per acre without manure, while the cultivators alongside, pursuing their usual methods, were unable to get more than 15bush. It appears that we have here a confirmation of the work recently done at Rothamsted by Messrs. Russell and Hutchinson on the increased fertility that follows partial sterilisation of the soil. Between April and June the temperature of the air in Western Bengal often rises above 100° F., and at the same time the heating effect of the sun on the soil is so great that its temperature goes much beyond that figure. The continual stirring of the soil and its exposure to these high temperatures, therefore, may well give results comparable with sterilisation, and thus produce an increase of fertility similar to that observed by the workers at Rothamsted after sterilisation by artificial means.

“The Pusa workers still have problems to face: rust is often the cause of serious loss in India, but it is hoped that by pursuing the methods by which yellow rust has been conquered at Cambridge, a wheat will be obtained immune to the disease; by similar methods it may be possible to improve the standing power of the straw, a quality in which the new wheats are capable of improvement.

“The valuable results that have followed the application of scientific methods to agricultural problems in India encourage the hope that the establishment of research institutes with the aid of the development grants will lead to equally valuable work being done in this country.”

THE WHEAT MARKET.

The favorable weather experienced for harvesting, and the settlement of the strike of railway men and dockers in the Argentine, together with the fact that supplies of Canadian wheat were coming forward more freely, resulted in a weakening of the market in the United Kingdom. The movement was immediately reflected locally, although prices did not decline to any great extent.

Commenting on the wheat situation, *Broomhall's Corn Trade News* of January 30th states—"We have now arrived at the end of the first six months of the current cereal year as reckoned in this country; therefore it will be interesting to collate the season's statistics regarding the shipments of wheat and flour from abroad, and consider how they are working out in comparison with the anticipations of last autumn. The gross requirements of the season are being estimated at 67,000,000qrs., as against last season's 79,000,000qrs. The actual quantity shipped in the first six months of this season is 32,000,000qrs. (compared with 42,792,000qrs. during the first half of last season), leaving a deficit of 35,000,000qrs. to be made up in the concluding six months.

"The one outstanding feature in this season's figures is the important falling off in the Russian contribution, which by itself accounts for the total deficiency of 10,000,000qrs., as compared with last season."

The writer estimates that the shipments of wheat and flour from all exporting countries will, during the second half of this season, total 35,000,000qrs., as against 40,034,000qrs. for the same period last season. Proceeding, he states:—"We are allowing for the U.S.A. shipping 11,000,000qrs. and Canada 12,000,000qrs. this season, against 9,000,000qrs. and 8,000,000qrs. respectively last season. We feel that the allowance is a very liberal one, but at a comparatively high level of prices and with good prospects next spring for the new crop, it ought to be possible. But such liberal shipments from North America and other countries, as we have predicted, will only be likely to take place as long as prices keep up at a distinctly remunerative level, for growers in all parts of the world are showing very plainly a most determined opposition to parting with their produce at prices which obtained last autumn. They all know now that there is not a single great crop anywhere in either hemisphere, and many are aware that the aggregate wheat production of the world is below that of the past two seasons, and, furthermore, that the aggregate production of other kinds of grain, such as rye, maize, barley, oats, and many other field crops, is less this season, relatively to the requirements, than ever before. The corrected total of the wheat production this season is shown below, in comparison with the two preceding seasons:—

WORLD'S WHEAT CROP.

1911—Qrs.	1910—Qrs.	1909—Qrs.
26,000,000qrs.	441,000,000qrs.	450,000,000qrs.

Date.	LONDON (Previous Day).		ADELAIDE.		MELBOURNE.		SYDNEY.	
		Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.
Feb. 6	Firmly held; Oct.-Nov., 4/9½; Liverpool very firm	..	3/8 to 3/8½	3/9	3/9	3/9	3/9	3/9
7	Steady, but quiet	..	3/7½ to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½
8	Firm, better demand; Jan.-Feb., 4/8½; Liverpool, Jan.-Feb., 4/9	..	Do.	3/8½ to 3/9	3/8½ to 3/9	3/8½ to 3/9	3/8½ to 3/9	3/8½ to 3/9
9	Steadily held, not active	..	3/8 to 3/8½	Do.	Do.	Do.	Do.	Do.
10	Steady, but quiet	..	Do.	Do.	Do.	Do.	Do.	Do.
12	—	..	Do.	Do.	Do.	Do.	Do.	Do.
13	Slow to sell; rather easier	..	3/7½ to 3/8	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½
14	Dull, easier tendency; no demand	..	Do.	Do.	Do.	Do.	Do.	Do.
15	Very dull, lower to sell	..	Do.	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½
16	Steady, but quiet	..	3/7½	Do.	Do.	Do.	Do.	Do.
17	Dull and neglected	..	3/7 to 3/7½	3/8	3/8	3/8	3/8	3/8
19	—	..	Do.	Do.	Do.	Do.	Do.	Do.
20	Very dull; no demand	..	Do.	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½
21	Steadier tone, but not active	..	Do.	Do.	Do.	Do.	Do.	Do.
22	Steady, but quiet	..	Do.	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½
23	Steady, but quiet; Liverpool dull	..	Do.	Do.	Do.	Do.	Do.	Do.
24	Very dull, lower to sell; Liverpool dull	..	Do.	Do.	Do.	Do.	Do.	Do.
26	—	..	Do.	Do.	Do.	Do.	Do.	Do.
27	Quiet; Liverpool very dull	..	Do.	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½	3/8 to 3/8½
28	Steady	..	3/6½ to 3/7½	Do.	Do.	Do.	Do.	Do.
29	Dull	..	Do.	Do.	Do.	Do.	Do.	Do.
1	Firm, more inquiry; Nov.-Dec., 4/9½; Liverpool steady	..	Do.	Do.	Do.	Do.	Do.	Do.
2	Firmer and quiet; Liverpool steady, but quiet	..	Do.	Do.	Do.	Do.	Do.	Do.
4	—	..	Do.	Do.	Do.	Do.	Do.	Do.
5	Firm, but quiet; Liverpool steadily held	..	3/7 to 3/7½	Do.	Do.	Do.	Do.	Do.
6	Do.	..	Do.	Do.	Do.	Do.	Do.	Do.
7	Steady, no quotation; Liverpool dull	..	Do.	Do.	Do.	Do.	Do.	Do.

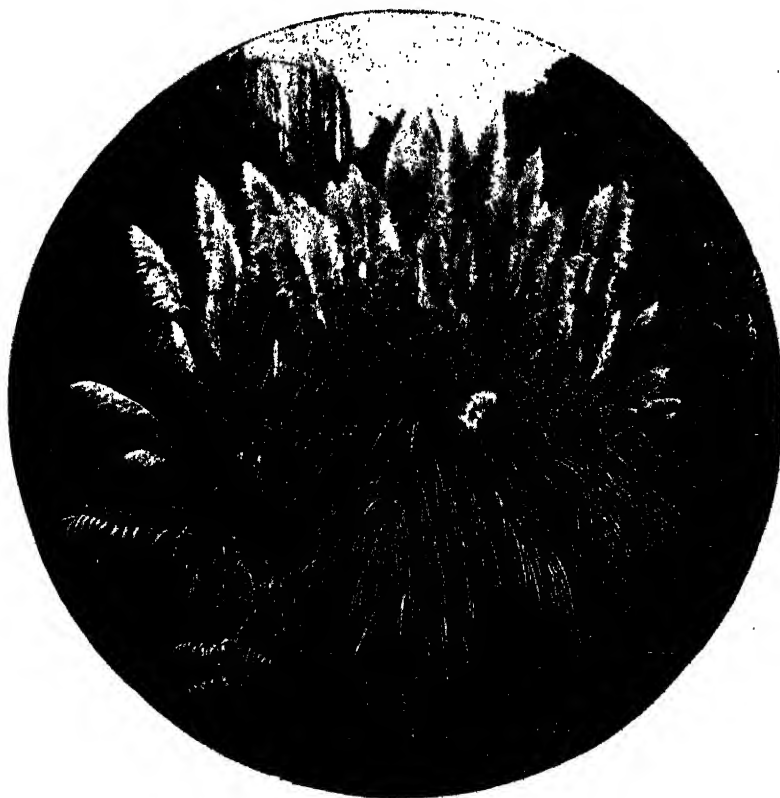
RAINFALL TABLE.

The following table shows the rainfall for February, 1912, at the undermentioned stations, also the average rainfall for the first two months in the year, and the total for the first two months of 1912 and 1911 respectively:—

Station.	For Feb., 1912.	Average to End Feb.	To End Feb., 1912.	To End Feb., 1911.	Station.	For Feb., 1912.	Average to End Feb.	To End Feb., 1912.	To End Feb., 1911.
Adelaide	0.37	0.60	0.54	1.47	Hamley Bridge	0.18	0.49	0.36	2.12
Hawker	0.34	0.54	0.34	0.32	Kapunda	0.28	0.61	0.38	2.58
Cradock	0.26	0.68	0.26	0.77	Freeling	0.53	0.47	0.59	2.86
Wilson	1.00	0.60	1.00	0.23	Stockwell ...	0.45	0.50	0.49	3.03
Gordon	0.58	0.61	0.58	1.07	Nuriootpa ..	0.32	0.54	0.39	2.00
Quorn	0.58	0.48	0.58	0.42	Angaston ...	0.43	0.48	0.46	3.01
Port Augusta	0.76	0.47	0.76	0.84	Tanunda ...	0.38	0.57	0.48	3.31
Port Germein	0.38	0.36	0.40	2.23	Lyndoch ...	0.55	0.52	0.55	1.40
Port Pirie ...	0.66	0.35	0.66	2.46	Mallala	0.14	0.44	0.31	1.57
Crystal Brook	0.34	0.52	0.53	2.11	Roseworthy .	0.12	0.45	0.37	1.77
Pt. Broughton	0.45	0.45	0.58	3.21	Gawler	0.36	0.63	0.52	1.64
Bute	0.44	0.33	0.44	2.18	Smithfield ...	0.37	0.55	0.46	1.58
Hammond ...	0.57	0.52	0.60	0.30	Two Wells ...	0.34	0.41	0.34	1.50
Bruce	0.68	0.66	0.68	0.63	Virginia	0.32	0.45	0.42	1.28
Wilmington .	0.76	0.50	0.81	3.59	Salisbury ...	0.26	0.54	0.47	1.97
Melrose	0.65	0.83	0.58	3.90	Teatree Gully	0.47	0.78	0.77	1.64
Booleroo Cntr	0.30	0.55	0.44	0.77	Magill	0.65	0.58	0.89	2.34
Wirrabara ...	0.63	0.59	0.71	1.60	Mitcham	0.31	0.42	0.40	2.61
Appila	0.36	0.62	0.42	1.41	Crafers	0.88	0.82	1.26	4.43
Laura	0.17	0.61	0.33	1.97	Clarendon ..	0.58	0.69	0.74	3.57
Caltowie	0.21	0.63	0.38	1.59	Morphett Vale	0.30	0.46	0.44	2.90
Jamestown ...	0.42	0.62	0.62	1.87	Noarlunga...	0.30	0.46	0.32	3.39
Gladstone ..	0.35	0.65	0.35	2.57	Willunga ...	0.53	0.60	0.60	3.54
Georgetown ...	0.30	0.66	0.71	2.31	Aldinga	0.41	0.33	0.44	2.17
Narridy	0.35	0.59	0.61	2.09	Normanville.	0.42	0.50	0.46	2.75
Redhill	0.75	0.60	0.87	1.91	Yankalilla...	0.45	0.31	0.49	2.73
Koolunga ...	0.45	0.71	0.57	1.68	Eudunda	0.62	0.50	0.71	2.50
Carrieton ...	0.38	0.51	0.47	0.27	Sutherlands .	0.62	—	0.63	1.27
Eurelia	0.80	0.48	0.88	0.99	Truro	0.58	0.51	0.64	2.70
Johnsburg ...	0.33	0.42	0.33	0.70	Palmer	0.14	—	0.22	2.50
Orroroo	0.48	0.58	0.56	0.42	Mt. Pleasant .	0.64	0.65	0.78	2.54
Black Rock ..	0.45	0.54	0.46	0.62	Blumberg ...	0.58	0.67	0.70	2.48
Petersburg ..	0.74	0.51	0.80	0.95	Gumeracha ...	0.63	0.68	0.85	2.38
Yongala	0.54	0.56	0.65	1.11	Lobethal ...	0.66	0.71	0.83	2.36
Terowie	0.33	0.69	0.41	1.81	Woodside ...	0.77	0.75	0.99	2.68
Yarcowie	0.45	0.58	0.45	1.68	Hahndorf ...	0.47	0.62	0.67	3.90
Hallett	0.55	0.57	0.67	1.96	Nairne	0.85	0.76	1.00	4.67
Mount Bryan	0.73	0.93	0.85	2.07	Mount Barker	0.45	0.85	0.60	3.58
Burra	0.39	0.64	0.53	2.51	Echunga	0.39	0.64	0.53	3.34
Snowtown ...	0.26	0.44	0.26	1.45	Macclesfield..	0.41	0.58	0.47	3.39
Brinkworth ...	0.50	0.70	0.50	1.57	Meadows	0.27	0.63	0.31	4.24
Blyth	0.54	0.55	0.60	1.73	Strathalbyn .	1.03	0.62	1.10	2.78
Clare	0.64	0.77	0.78	2.49	Callington ...	0.46	0.51	0.48	2.22
Mintaro Cntrl.	0.40	0.69	0.52	3.16	Langehorne's B.	0.67	0.46	0.77	1.51
Watervale ...	0.65	0.64	0.83	3.79	Milang	0.61	0.52	0.69	1.31
Auburn	0.75	0.78	0.87	2.80	Walleraroo ...	0.76	0.37	0.82	1.83
Manoora	0.56	0.50	0.75	1.88	Kadina	0.68	0.34	0.70	1.95
Hoyleton	0.30	0.45	0.03	2.93	Moonta	0.60	0.37	0.60	2.34
Balaklava ...	0.29	0.42	0.29	3.17	Green's Plains	0.47	0.28	0.49	2.00
Pt. Wakefield	0.82	0.47	0.84	5.56	Maitland ...	0.40	0.43	0.43	3.45
Saddledworth	0.58	0.68	0.71	1.60	Ardrossan ..	0.33	0.35	0.36	1.92
Marrabel ...	0.52	0.48	0.63	1.35	Pt. Victoria..	0.62	0.32	0.65	2.42
Riverton ...	0.54	0.56	0.71	2.33	Curramulka..	0.31	0.28	0.31	2.56
Tarlee	0.65	0.51	0.74	1.53	Minlaton ...	0.59	0.33	0.59	2.14
Stockport ...	0.49	0.42	0.59	1.76	Stansbury ...	0.37	0.32	0.42	2.02

RAINFALL TABLE—*continued.*

Station.	For Feb., 1912.	Av'ge. to End Feb.	To End Feb., 1912.	To End Feb., 1911.	Station.	For Fe., 1912.	Av'ge. to End Feb.	To End Feb., 1912.	To End Feb., 1911.
Warooka ...	0.55	0.36	0.55	3.91	Bordertown..	0.02	0.41	0.09	2.61
Yorketown ..	0.75	0.30	0.75	2.91	Wolseley ...	—	0.32	0.05	2.60
Edithburgh..	0.44	0.41	0.50	2.06	Frances	0.38	0.30	0.42	3.05
Fowler's Bay	0.39	0.37	0.39	1.04	Naracoorte ..	0.44	0.59	0.52	2.90
Streaky Bay.	0.71	0.47	0.71	1.42	Lucindale ...	0.42	0.48	0.47	3.19
Pt. Elliston..	0.27	0.49	0.27	1.64	Penola	1.37	0.73	1.48	4.39
Pt. Lincoln..	0.99	0.50	1.01	1.60	Millicent	1.65	0.77	1.67	4.58
Cowell	0.86	0.46	0.86	1.10	Mt. Gambier.	2.21	0.95	2.28	4.70
Queenscliffe..	0.84	0.37	0.84	—	Wellington ..	0.19	0.40	0.27	2.96
Port Elliot...	0.70	0.65	0.79	1.77	Murray Brdg.	0.08	0.40	0.17	2.17
Goolwa	0.74	0.56	0.93	2.73	Mannum	0.09	0.38	0.10	1.44
Meningie ...	0.69	0.52	0.72	1.99	Morgan	0.48	0.40	0.48	2.29
Kingston....	0.95	0.54	1.03	3.35	Overland Crnr.	0.33	0.58	0.35	3.34
Robe	1.00	0.60	1.10	4.18	Renmark....	0.66	0.61	0.79	3.59
Beachport...	0.81	0.70	0.86	4.44	Lameroo	0.16	—	0.17	0.83
Coonalpyn...	0.29	0.39	0.42	2.03					



DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on February 1st—

BUTTER.—There is a very fair quantity of cream coming in, despite the hot spell of weather experienced. The quality of the butter is well maintained, and the demand is excellent. The variation in price during the month has been very slight; the present prices are—superfine, 1s. 5d.; pure creamery, 1s. 4d.

A. W. Sandford & Co., Limited, report on March 1st—

BUTTER.—A heat wave practically continued throughout February, resulting in injury to quantities of produce, especially butter in the marketing and cream in transit. The result was a rapid lessening in top grades, and competition for these continuing brisk, a substantial advance in prices was established. Stores and collectors' lines also participated in the firming; but weather-affected creamery, factory, separator, and dairies, much of which required refrigeration before being fit to offer, sold according to condition. Best factory and creamery, fresh in prints, was quitted at from 1s. 3½d. to 1s. 5d. per lb.; choice separators and dairies, 1s. 2d. to 1s. 3d. per lb.; weather-affected lots, 11½d. to 1s. 0½d.; stores and collectors', 11d. to 1s.

EGGS.—A very active market has been experienced for eggs and higher rates obtained than known for years at the corresponding period. The trade as usual operated freely for all guaranteed lines of prime new-laid hen, which sold at 1s. 2d. per doz.; duck brought 1s. 3d.

CHEESE.—The heavy export, together with inland demand has considerably reduced stocks of South Australian factories, and as values throughout the Commonwealth are higher, the firming here in selling rates was considerable, there being every probability of prices maintaining. Quotations were from 8½d. to 9d. per lb. for large to loaf.

BACON.—Owing to the intense heat during the month curers were chary of purchasing heavily. A very fair turnover was, however, put through of established brands of factory-cured sides, middles, and rolls. Sides realised from 7d. to 7½d. per lb.

HAMS are in somewhat better request, at from 9d. to 10d. per lb.

HONEY.—Apiarists in most of the districts are disappointed at the light flow this season, and as there is a good call for choice clear extracted, considerably higher values than usual are obtainable this year. Prime clear extracted is selling at from 3d. to 3½d. per lb. Beeswax, 1s. 3½d.

ALMONDS.—Already some parcels of the new crop are being marketed, and as a strong inquiry exists, ready quitances are effected. Brandis, 5½d.; mixed soft shells, 5d.; kernels, 1s. 1½d.

LIVE POULTRY.—The demand for all well-conditioned table birds continued, and consequently prices for these were maintained, but the usual difficulty was experienced in disposing of light and poor quality or weedy birds. Good table roosters brought from 3s. to 3s. 9d. each; well-conditioned cockerels, 2s. 6d. to 2s. 9d.; hens, 1s. 10d. to 2s. 3d. poor and light stuff sold at lower rates; ducks, 1s. 10d. to 2s. 6d.; geese, 2s. to 4s.; pigeons, 7½d.; turkeys, from 10d. to 1s. per lb. live weight for fair to prime; lightweights, from 6½d. to 7½d.

POTATOES.—A fairly heavy turnover has exhausted the supplies from the plains, and now only a few lots are coming in from the later districts in the hills. Gambiers, however, are arriving more freely, and are practically furnishing country supplies. Present quotations—New locals, from £6 to £7 per ton, Adelaide; Gambiers, from £4 to £4 5s. on trucks, Gambier.

ONIONS.—Despite the fact that the locals are light in yield, the lower quotations from Victoria have caused a decided reduction in prices. Values for locals range from £10 to £11 per ton, Adelaide; Gambiers, £7 15s. per ton on trucks, Gambier.

AGRICULTURAL BUREAU.

ANNUAL CONFERENCE OF UPPER NORTHERN BRANCHES.

The Annual Conference of the Upper Northern Branches of the Agricultural Bureau was held at the institute, Orroroo, on February 28th and 29th. The representatives of the Department present were—Hon. T. Pascoe, M.L.C., Minister of Agriculture; Professor Lowrie, M.A., B.Sc., Director; Messrs. J. F. McEachran, M.R.C.V.S., and C. E. Loxton, M.C.V.S., Government Veterinary Surgeons; S. McIntosh, Director of Irrigation; P. H. Suter, Dairy Expert; and Henshaw Jackson (Wool Instructor), Geo. Jeffrey, C. J. Tuckwell (members), and G. G. Nicholls (Secretary), Advisory Board of Agriculture. In addition to a large number of visitors, the undermentioned Branches were represented by the following gentlemen as delegates:—Amyton—A. Crisp, R. Brown, T. Griffin, W. Gum; Carrieton—F. Kraeger, E. W. Radford, F. Vater; Willowie—D. McCallum; Morchard—B. S. McCallum, W. A. Toop, E. J. Kitto, J. B. McDougall; H. J. Kupke, J. W. Aspinall; Coomooroo—E. Berriman, A. G. Polden; E. H. Hall, J. R. Chapman; Arden Vale and Wyacca—O. E. Hannemann.

Mr. Berriman (Chairman of the Coomooroo Branch) introduced the Minister of Agriculture (Hon. T. Pascoe, M.L.C.). He congratulated him on his return to office, and in calling on him to open the Conference, said all who attended should learn something that would be of benefit to them. There was a large number of young farmers in the district, and it would pay these men especially to attend the meetings of the Bureau. The introduction of new machinery and methods of cultivation had made it more than ever essential that the farmer should fully understand the problems connected with the soil. Farmers in the Northern Areas experienced the greatest difficulty in their attempts to carry out experiments, and through various agencies over which the farmer had no control, the efforts were attended with little success. Although excellent work was being done in this regard at the Roseworthy College, the farmers in the Upper Northern Areas were little benefited. It would be an excellent thing if the Government would conduct an experimental farm somewhere in this district, and if a capable man had the management of it much good would result.

MINISTER'S OPENING ADDRESS.

The Minister said as a farming community it was advisable that they should meet together and compare notes on every possible occasion. That was the

idea of the founders of the Agricultural Bureau, and there was no doubt that in a large measure the purpose has been realised. Farming in South Australia was a very different proposition to-day compared with what it was prior to the inauguration of the Agricultural Bureau system. Generally speaking, the spirit among the farmers was altogether different from that which animated those in most other departments in life. For instance, when a manufacturer evolved a new idea, say in connection with a machine, he promptly patented it, so that nobody else would be able to utilise it without payment. When a farmer discovered anything of value, however, he was only too glad to tell others, so that they might benefit thereby. That was how it ought to be. He was convinced that the gratifying improvement which had marked farming in the Central State had been largely due to that helpful interchange of ideas and experiences. He looked upon the Far Northern District as being more interested than any other agricultural area in the development of methods which would enable them to minimise as much as possible the effects of the periodical dry seasons. He had been working on those lines for a considerable time a few miles to the east of Terowie, and he proposed that afternoon to make a few comparisons.

Last year was one of the driest, especially so far as the growing period was concerned, that they had had for a long time. It was the driest year he had had at his place since he had been keeping records. At one time he made it a practice to use the official rainfall records at Terowie Post Office as a guide, but some years ago he obtained a rain gauge of his own. He had been surprised to find that, although his homestead was only three miles due east of the township, and that distance outside the line of rainfall, in ordinary seasons there was a difference of about 33 per cent. between his gaugings and those at the post office. If they proposed to work on scientific lines they would find the expenditure of 15s. on a rain gauge would prove a great advantage and would soon be amply repaid. His rainfall last year was 9·6in., but it was distributed too much over the whole 12 months, and not enough over the growing period. In January he had 0·38in., February 1·37in., March 1·08in.—that represented nearly 3in. out of the 9in., which would have been wasted had he not taken care of it—April nil, May 2·15in.—a little more than 2in. fell in the first fortnight—June 0·53in., July 1·08in., August 0·79in., September 0·67in.—it was getting less when it ought to have been increasing—October 0·10in.—a lamentable shortage for that vital month—November 0·10in., and December, when it was too late to be of any service, 1·36in. In the growing period, from May to November inclusive, when good rains were so necessary in the north, he had only 5·42in. Some of his wheat—just over half of it—was in before the beginning of May. That had about 5½in., but the remainder, from the time of sowing to the time of reaping, received only 3·66in. Ever since he had been sowing it Federation had beaten all other wheats on the farm by between 3bush. and 4bush. until last

season, when it did not average quite 6bush. The other varieties which he tried were Bearded Gluyas, which was recommended some years ago by Professor Perkins, and Viking, which he used for the first time, the seed having come from Carrieton. The two wheats had, on 3 $\frac{1}{2}$ in. of rain, yielded as follows:—Viking, 8bush.; Gluyas, 7bush. to the acre. On all his former experiences a rainfall like that of last season would have meant an absolute failure. With a rainfall under 10in. he had never reaped anything. When the precipitation was between 10in. and 11in. he had reaped very little. Last year, notwithstanding the limited quantity of moisture available, and severe frosts during the most critical stage in the growth of the wheat plants, and a grasshopper plague, he averaged approximately 7bush. This return he regarded as the best he had obtained since he had been farming.

CONSERVATION OF MOISTURE.

Seven bushels on a rainfall of 3 $\frac{1}{2}$ in. demonstrated beyond the shadow of a doubt that something could be done by means of cultivation to assist nature at such times. They had not gone into the question with anything like sufficient energy and thoroughness in the past. The subject of the conservation of soil moisture was of primary importance from the standpoint of the farmers gathered at that Conference. If the effect of the periodical dry seasons was to be minimised at all it would be by exercising their brains in the way he had indicated. His operations and achievements had convinced him that the proper time to work the land to ensure the best results was immediately after each rain. A mulch on the surface was necessary at the earliest moment to minimise loss by evaporation. Those were the principles upon which he had been working during recent years. Although they tilled their land as much as he did his own, his neighbors had not reached half his yield, because they had not worked their land at the right time. The two heaviest falls of rain on his place in 24 hours after the second week in May were 0.44in. on July 11th, and 0.46in. on August 11th. There was not another fall exceeding 0.30in. during the whole of the growing period. An inch of rain scattered over a month in light showers was not so useful as a similar quantity in a few hours. It was worthy of notice that in 1904, on a 10 $\frac{1}{2}$ in. rainfall, he reaped 60 bags of wheat from 400 acres. In 1905 he had 10.21in. of rain, and his crop averaged 2 $\frac{1}{2}$ bush. to the acre. Two years later, when he first farmed with a view to conserve the soil moisture, he obtained an average of 13bush. on a rainfall of 11.46in. In 1904, from May to November, he had 6.69in. of rain, compared with 5.42 last year, the out of season rains having been 3.87in. against 4.19in. In 1905 the precipitation in the growing period amounted to 7.75in. while the out of season moisture aggregated 2.43in. In 1907 the falls were 3.81in. and 2.65in. respectively. He did not advocate any particular system of dry farming. He had been credited with having a fad, but he had put it into practice on his property, and it had paid him.

IRRIGATION AND LUCERNE.

Mr. R. C. Sharp read the following paper :—

" This paper aims in a general way to set forth the experiences of the settlers on the Pekina Creek Irrigation Area. The settlers had absolutely no practical knowledge of lucerne-growing at the time of their taking up the blocks, as the Government Experimental Block was not fully under way when the first settlers commenced irrigating, although sufficient work had been done to illustrate that this country was eminently suitable for lucerne-growing. The varieties of lucerne which have proved to be the most profitable are Hunter River and South Australian. Arabian lucerne is the fastest grower for the first fortnight after being cut, but the other varieties mentioned bear much heavier crops at maturity; and, therefore, as it is more profitable to cut than graze, it is obvious that Hunter River and South Australian are the best. It has proved difficult to obtain the genuine varieties of the Hunter River and South Australian lucernes, and several settlers have had to resow on this account. It has been observed that the Hunter River and South Australian each have the characteristic of growing upright after the first two leaves have appeared, whereas the inferior varieties cling to the ground for the first 12 months. In view of the difficulties the settlers have had in this respect it would be of considerable assistance if, instead of cutting lucerne at the Government Experimental Block here, the seed was saved and made available to the settlers.

" Undoubtedly broadcasting is the best method of sowing, as the seed may be more evenly distributed over the surface than with the drill, even if cross-drilled, and therefore a more uniform stand is obtained; and also by this method the plant fully covers the ground and so counteracts evaporation. Although 10lbs. of seed would provide an excellent stand of lucerne in two or three years, by sowing from 15lbs. to 20lbs. the stand is established in the first year and the extra yield more than compensates the extra cost of seed. Summer sowing has the advantage over autumn or spring sowing on account of the plant becoming strong and indestructible before the grasshopper arrives, and also as weeds do not grow so abundantly. It is important to give the ground a good soaking at the time of seeding so as to fully germinate the seed, after which no more water should be applied until the plant shows signs of withering, which should not occur until from six to eight weeks after sowing. Too much water given to the plant when it is young will have the effect of checking it for at least a couple of years.

" When the lucerne is established, watering about a fortnight before cutting and again within a week after, proves most beneficial; that is about twice every five weeks from September to April. This means about 14 waterings, and if the water is flooded on, equals 35in.; and if put on with sprinklers, about 20in.

"The settlers are allowed 12in. of water a year, and with the average rainfall of about 9in.—which is of very little use, as it falls when the lucerne is dormant—this makes a total of 21in. This is absolutely inadequate, as anyone who has tried lucerne-growing will know. One has only to read the reports of the irrigation colonies in America and elsewhere to recognize the absurdity of trying to grow lucerne with this amount of water. The settlers here have recognized this, and instead of growing lucerne on their full area of irrigable land are content to use the whole of their supply of water on half, and so give the lucerne the amount of water it requires. They realise that it is better to have a good crop of five acres than to have a poor crop of 10. It is therefore necessary that more water should be granted, so as to enable the settlers to grow lucerne on the full area of their irrigable land. The excess water charge is 3d. per 1,000galls., but it would never pay to use water at this rate; but rather than let the lucerne die, a few settlers who have put in their full area have done so, in the hope that more water will be granted at an early date.

"It has been proved beyond the slightest doubt that five acres of lucerne will keep 20 cows in full profit all the year round, providing either ensilage or hay are available for the winter months. Thus a block of 10 acres would keep an established herd of 40 cows. Allowing 10 of these to be dry stock, the remaining 30 in full profit should return an average of 12lbs. of butter per week. This should represent 15 cans of cream per week, at an average profit to the producer of £1 per can. Apart from this return the by-products would amount to at least £2 per week. Thus it will be seen that, if the whole of the blocks could be got under way and in full profit, the produce from this irrigation area would amount to something over £35,000 per annum. The freight derived by the Railway Department from the cream cans alone would amount to about £1,600. This clearly shows that it would be good policy for the Government to offer every assistance in its power to the settlers to enable them to work their blocks to the full producing capacity.

"Of the 400 acres that comprise the irrigable area of the scheme, only 192 acres have been irrigated. Of these 192 acres only 81 acres can be said to have established lucerne. Of the unestablished remainder 30 acres have been sown twice and 25 acres will have to be resown. Of the 86 acres which are likely to be established, 70 should become so about next spring.

"The two principal reasons why the remaining 208 acres have not been irrigated are because the lessees of these blocks either have not sufficient means to profitably work their blocks, or else, as before stated, they prefer to use the whole of the water allowance on five acres instead of 10, so as to ensure a good stand of lucerne. Roughly, it takes about £100 to lay piping on each block of 10 acres. As the irrigating has to be done by the sprinkling method, it is imperative that pipes should be laid down so that every yard of lucerne can be properly watered. This has been a great drawback to many settlers

who have not capital enough to properly lay down piping, but they have been anxiously holding on and awaiting the time when they can take advantage of the Advances to Settlers Act. A petition is now being signed, to be sent to the Commissioner of Public Works, to have the colony transferred to the Department of Crown Lands, and if this is done the settlers will be entitled to the privileges enjoyed under the above Act. Therefore, with these privileges and more water—say, not less than 20in.—the settlers will be able to go ahead, and in the near future the colony should be a grand success, as where at one time one family lived there will be 40 all enjoying prosperity, and where before was but dry and shrivelled grass will be hundreds of acres of luxuriant lucerne on which the dairy cattle will grow fat and yield thousands of pounds of butter to the blockers.”

THE DISCUSSION.

Mr. McIntosh, in congratulating the writer of the paper, said he felt sure that under fair treatment the results forecasted by Mr. Sharp could be realised. The original policy in regard to the farm was to grow as many varieties of lucerne as could be secured, and ascertain by experiment those that were most suitable for the district. The results had clearly demonstrated that the Hunter River and South Australian varieties were the best. It was the intention of the department to allow these varieties to seed, and distribute this amongst the producers. The lucerne-grower knew that the lucerne has to be two or three years old before it would grow a successful crop, and therefore it would be another year before the seed from the block would be ready for distribution. He agreed that the amount of water allowed the blockers was insufficient.

Mr. J. C. Hagger (Orroroo) had saved lucerne seed for resowing, but the germination had only been about 5 per cent. He dried the seed in the sun for a few days, after which it was packed into a tin. He asked whether he had adopted the proper course for drying the seed.

Mr. McIntosh said that without seeing the seed it was difficult to say why the germination was so low. The usual method of drying was to run over the crop with the stripper just when the seed was turning a dark-brown color, and then pile it in a heap. At Murray Bridge, where this practice had been adopted, the germination had been as high as 98 and 99 per cent.

Mr. H. D. Gray (Orroroo), who was a holder of two irrigation blocks, said he found that the amount of water allowed for the two blocks was only sufficient to irrigate one. Considerable trouble had been experienced with grasshoppers, but he had found that flooding the crop saved the lucerne plants.

Cultivating Lucerne.—Mr. J. C. Hagger (Orroroo) inquired whether it was advantageous to loosen the soil occasionally where lucerne was growing.

Mr. McIntosh replied that if the ground was cultivated after the crop had been irrigated it would be found that the results would be considerably

improved. Experiments made from time to time had proved this conclusively. The rotary disc was the implement almost universally used, and was undoubtedly the most suitable.

JOHNSON GRASS.

Mr. T. H. P. Tapscott (Ororofo) stated that he had noticed that Johnson grass had during the past few days been making very heavy growth in this district. He would like to know the feeding value of this grass.

The Director of Agriculture stated that stock would eat this when it was green, but when it was dry they would not touch it. If the farmer had what might be termed a piece of waste land, where practically nothing would grow, it would possibly pay him to grow Johnson grass. He had tried it at Roseworthy, and had cut it for hay, but it was anything but successful.

Mr. McIntosh stated that this grass had been grown at Murray Bridge, but his opinion was that it would have been better if it had not been introduced. It was tried on a piece of waste land, but all the plants died out within 18 months' time of the planting.

THE BUREAU A FACTOR IN AGRICULTURE.

The Secretary to the Advisory Board (Mr. G. G. Nicholls) appealed to the delegates and visitors present to use their influence to bring as many producers as possible into the ranks of Bureau membership. It was significant that those farmers who had been longest associated with the Bureau were loudest in their praises of it.

Mr. Jeffrey (Advisory Board) pointed out that the aim of the Board was to benefit the producer in every way possible.

Evening Session.

CONSERVATION OF SOIL MOISTURE.

The Director of Agriculture (W. Lowrie, M.A., B.Sc.), in the course of an interesting address, said—"The most important problem in those northern areas was the conservation of the moisture in the soil, and any farmer who had a rainfall of from 11in. to 13in. must work throughout the season in the thought that the next would be a dry one. It was not often realised that those semi-arid areas had advantages of considerable importance. All the world over the soils in the drier districts were richer than those of the same geological formation in localities where the rainfall was heavier. For one thing, they contained a much higher percentage of lime, one of the most valuable nutrients conducing toward fertility. In lime alone the difference between 15in. and 30in. country might be something like 12 times as much in favor of the former. The quantity of potash would be nearly double, and of phosphoric acid there would be a trace more. The organic matter, as might be

expected, would be less. Ordinary fallowing operations tended to consume the organic matter, and that was a danger which always should be borne in mind. So far as available nitrogen was concerned, the soils in dry areas were richer than those in more humid parts. Therefore, while the problem of the men fortunately situated in regard to humidity was the maintenance of fertility, the problem of the men in the drier areas was much more the conservation of soil moisture. Another advantage which characterised the latter soils was that they were more open, thus enabling the roots of plants to penetrate more easily and considerably deeper. There was also the benefit of deeper aeration. In humid country the subsoil often was sour and raw through lack of aeration. In connection with this aspect of his subject he desired to emphasize that the roots of plants went down in a large measure according to the efforts which the farmers made to let the moisture down and keep it there. Comparatively dry soils also absorbed more moisture from the air than those supplied with a big rainfall. A fact not generally known was that although they might not grow so much to the acre in the drier areas as was possible farther south, the produce raised possessed a higher feeding value. It had been estimated by an American writer that in 1,000,000bush. of wheat grown on dry country there was the same nutrient value as in 1,025,000bush. produced in humid country. The natural grasses also were richer, as was evidenced by the stock. It had been ascertained that a wheat plant required 350lbs. of water as a minimum to form the equivalent of 1lb. of dry matter, and it was reckoned that under normal conditions between 700lbs. and 800lbs. of water were needed in the formation of 1lb. of dry matter. Of course the greater the supply of nutrients in the soil the less moisture was necessary to build up the 1lb. of organic matter. That explained, in a measure, how they managed so well on such a short rainfall. There was no doubt, however, that they could well do with more moisture than they had as a rule. The question, therefore, was by what means could the moisture content of the soil be increased.

FALLOWING.

"Many years ago South Australian farmers had discovered one of the means—thorough and systematic fallowing. To demonstrate at a glance the influence of fallowing he had had analyses made of soils taken from fallowed and grass land at the Parafield Experimental Farm on February 22nd. The plots from which the samples had been taken were not more than 15ft. apart. At a depth of 6in. the average percentage of moisture in the soil from the grass land was 2.62, while that of the soil from the fallowed ground was 5.32. The other results obtained were:—12in. deep, 11.45 and 18.76 respectively; 18in., 15.13 and 20.11; and 24in., 14.25 and 19.37. They would see that the average quantity of moisture at 12in. deep was more than 7 per cent. greater under the fallow than under the grass. On the

figures given it could be fairly assumed that the quantity of moisture found in the foot of soil from 6in. to 18in. deep on the fallowed land was equal to 5,000galls., or over 1in. of rain per acre, over and above that at a similar depth on the grass land. The supply of moisture in each foot would be greater than in the grass land even down to 10ft., and as the roots of wheat penetrated 6ft. or even 8ft. deep it was easy to appreciate what that increased quantity would mean, especially in a dry area. There was a time when a season such as that experienced last year would have spelt disaster. That the yield was so favorable had been due almost entirely to the extensive fallows, assisted by phosphates.

THE TIME TO FALLOW.

"In fallowing, the time at which the work was done was of material importance. The man who ploughed in September could not hope to obtain the best results. To show that such was the case he had secured the results of some moisture tests made at Roseworthy. The analyses were of soils from the surface down 6in., from 6in. to 13in., and from 12in. to 18in. deep. Land ploughed in August, 1911, had revealed 4.6, 13.3, and 17.3 per cent. of moisture at the respective depths; that ploughed on September 26th, 4.2, 13.6, and 15.3 per cent.; and that ploughed on February 21st of the present year 2.2, 8.2, and 13.9 per cent. From those figures it was obvious that the later they ploughed the less moisture they would be able to get into the soil for the ensuing season's crop. Farmers, especially those in the dry areas, should get their fallowing done early." By adopting that practice they would enable the moisture to penetrate into the subsoil, and by taking proper steps it should not be difficult then to keep the bulk of it there. Both theory and experience pointed to the wisdom of fallowing early. Of course care must be taken not to work the land when it was wet, otherwise it would become 'puddled,' and evaporation would be facilitated instead of being retarded. Some men recommend the use of the subsurface packer, and urge that the newly-ploughed land should be subpacked within 12 hours. Personally he had very little time for that implement, and would as soon wheel a perambulator over his land as use it. Mr. Griffin, of Hammond, stated that he had obtained the best results from land which had been subsurface packed; but he (the speaker) contended that other influences had contributed to bring about the higher yield on that particular plot. His reasons for the stand he took were that if the subpacker fulfilled anything of its purpose it helped to firm the bottom of the furrow slice and draw the moisture nearer to the surface, which was just the thing it was desirable to avoid. They might have noticed that when they went over the ploughed land with a team under average conditions every footprint was marked by a firm surface, and the natural mulch was consolidated. As a result in these spots evaporation was increased. In preference to the subpacker he recommended the use of the

spring-tooth cultivator, which provided a fine tilth underneath and brought the clods to the surface, the condition most desired. After the cultivator it was a good plan to use the ordinary disc harrow. The latter implement proved most efficacious in the spring, when it served admirably to secure a nice disintegration of the soil. It was advisable not to make the surface of the soil too level or too fine, otherwise there was every likelihood that a material proportion of a heavy rain would run off and thus be lost. In dry areas where the soil conditions were favorable it would pay to plough deeply, say 6in. or even 7in. deep. In dealing with new land 4in. would perhaps be better than 6in., because new land, as a rule, had a tendency to remain too open. As seed time came round it was well to work the fallows down fairly fine, with the object of providing a good seed bed, and thus assisting the plants to get away quickly. He was in favor of heavier dressing of manure than they were prone to apply because, among other reasons, of the better growth of herbage which would follow the crop and ultimate provision of additional organic matter. He was beginning to think that stinkwort was more of a blessing than the reverse, as it helped to open up the soil and supplied humus. In the dry areas it was advisable to sow a little thinner than where the conditions were less arid, and to place the seed deeper, say, 2in., so that it would be nearer to the moisture supply. He was inclined to think that by the pursuance of that course they would get a better sample of grain and a larger yield. In good seasons thick seeding—nearer a bushel—no doubt would produce the heaviest returns. He did not consider it would be well to attempt to make a living as an agriculturist on country where the rainfall was under 11in. on the average. In conclusion, he expressed the opinion that South Australian farmers were not credited with all that they had done in the direction of working out the salvation of farming in dry areas. For many years the best men here had been operating on lines closely approaching the best practices recently laid down by the most advanced advocates of scientific methods."

DISCUSSION AND QUESTIONS.

Mr. D. McCallum (Willowie) pointed out that he quite agreed with the remark of the Director that the use of the subpacker was inadvisable in South Australia. He had discarded the implement.

Mr. T. Goun (Amyton) considered that the best time to cultivate the fallow was between harvest and seed time, as soon after seed time as possible. He would like to know whether it would be advisable to work the land after a light rain with the harrows, and after a heavy rain with the cultivator.

Professor Lowrie said some farmers were regularly adopting this method. If the land was worked up at seeding time the farmer would get the benefit of the autumn and winter rains, but there was very little land that could be worked at that time. It would be an advantage if the teams could be got in

before seeding. With regard to harrowing after a very light rain, it was a mistake to work the surface of the land up dusty, as it would set much harder with the next rain. There was a degree beyond which it was detrimental to work the land. The idea of working was to break the connection between the top of the soil and the moist subsoil.

The Hon. T. Pascoe, M.L.C., said the only difference between the system recommended by supporters of the dry farming method and that advocated by the Director in his remarks was in regard to the subpacker. With the ordinary depth of ploughing adopted in South Australia the subpacker was unnecessary; and so far as he was personally concerned, it had been put aside. The subpacker was used for the purpose of pulverizing the subsoil and doing away with the large air spaces. Whatever necessity there might be in America for the subpacker, it was not necessary here. With regard to the relative values of the disc harrow and the cultivator, he considered that on some lands it would be dangerous to use the former on fallow. He preferred the ordinary cultivator, for the reason that it did not turn the land up so fine, and so the latter did not cake so readily. During the past few years in some parts of the State farmers were becoming somewhat negligent, and were not farming quite so well as they were five years ago. This season had taught the lesson that thorough and systematic farming was necessary.

Mr. S. McIntosh (Director of Irrigation) pointed out that in America to-day gang ploughs, throwing a slice of from 12in. to 14in. were being used. There it was necessary to break up these slices. In the Western States they were just beginning to use a plough similar to that used in South Australia. The farmers who used this plough considered that they were getting better returns than they had from the gang ploughs and subpackers. But a great part of the country there averaged from 12ft. to 16ft. in depth of soil. From this it would be quite understood that the conditions obtaining there were entirely different from those of South Australia. The South Australian farmer had practically nothing to learn from the American; in fact, in a great many ways he was ahead of the American.

FALLOWING.

Mr. B. S. McCallum (Morchard) contributed the following paper on this subject:—"Every farmer should decide before the following season the paddocks he intends fallowing, and feed them down as bare as possible. If he has not a flock of sheep to feed the land bare it will be necessary to burn all straw or dry grass during the autumn months; for land that has a bare surface always fallows a great deal better, especially in wet weather, than ground that has straw or dry grass on it, as the rubbish not only sticks about the ploughs and makes them heavier to draw, but prevents the soil being turned properly by the mouldboard. Even if the plough does go through the rubbish, it only remains amongst the soil, so under the working of the fallow

in the future. Another point to bear in mind is that the farm should be worked as evenly as possible, for where the land varies operations should be so arranged that a portion of each class of land is fallowed yearly, so that if a very wet spell of weather is encountered during the fallowing season the farmer can work on the land that is suitable for working in wet weather; the same applies to the land that works best in dry weather. This enables the team to be kept going regularly, and the land to be worked under the best conditions. Sometimes in the same paddock there is rising land that fallows well in wet weather and flats that cannot be worked at the same time. It will be necessary to work short pieces on the rising land and leave the flats until they dry a little, for it is a great mistake to rush the team through boggy flats. Not only is there a likelihood of injuring the horses, but the land is better left alone than turned up in great wet clods to bake hard in the sun. If it can be so arranged to fallow the paddocks adjoining those under crop it will be found a great saving on the fences, on account of there being no big stock grazing on the fallow to reach over the fence into the wheat crop. There are two important points to bear in mind when working the land at fallowing time. First, work the land so as to enable all the seeds of weeds and wild oats to grow; second, work the land with the idea of conserving the moisture. It would pay every farmer who has dirty land to cultivate it before the plough is started. If this is done to a depth of, say, 2 in., it will break the hard surface and a great portion of the seeds of weeds of various kinds that lie on top of the land will be stirred up with the soil, and given an opportunity of growing before the plough is put in. When the land is ploughed it will kill those weeds that have started, and turn the remaining seed under in fine soil, which they require before they will grow. I have obtained the best results in cleaning land by cultivating before the plough and then cross-harrowing when ploughed, if possible before any heavy rain has fallen to set the land, for if harrowed when it is loose just as the plough leaves the ground then the loose soil is shaken down with the oat seeds into the bottom of the furrow and the clods remain on top. If this is done I find that the greater portion of the oats is placed in a position favorable to germination. Care must be taken to prevent any of the plants going to seed. A great deal depends upon how the fallow is worked as to how the moisture is conserved in the soil. I favor shallow re-ploughing on fallow that has a thick growth of plants to be destroyed. One good ploughing will often kill more weeds than two or three cultivatings. After the fallow has been re-ploughed it is necessary to harrow it any time after light rains, thus bringing the land to a fine surface, which will prevent the moisture from evaporating during the summer months."

THE DAIRYING INDUSTRY.

The Government Dairy Expert (Mr. P. H. Suter) delivered an interesting address on the necessity of greater care in the selection, breeding, and feeding

of dairy cows. He stated that altogether too great a proportion of the dairy cows kept in the State were suffering from blind quarters, or other complaints due to want of careful treatment. The average yield from cows in this State was not above 220 galls. per annum. Contrasting this with such countries as Denmark it would be seen that local dairymen were not getting the best out of their cows. A cow could not be kept for less than £7 10s. per annum, that was allowing for every fair charge. If the return was only 100 lbs. of butter, which at 10d. per pound amounted to £4 3s. 4d., it would be seen that a direct loss of £2 16s. 4d. was occasioned on each such cow. The line of breeding in the majority of cases was wrong. Not nearly enough attention was paid to this phase as a general rule. It was necessary to breed heifers that would prove profitable. It must not be forgotten that like begets like. Good bulls should be secured and bred from. A good sire would improve the whole herd in a very few years. Then it was absolutely essential that the cows should be well fed. The treatment meted out to young calves, as a general rule, right throughout the State was a discredit to all concerned. Dietetic troubles were due to carelessness in feeding and mismanagement generally, and the milk yield from the beast in after years was seriously affected. Good heifer calves should be secured, and they should be well looked after if a profitable dairy herd was required. He considered it advisable to take the calf away from its mother when it was 24 hours old, by which time the mother should have cleaned it and given it a drink. It should be fed three times daily with milk from its mother for the first 10 days. This necessitated considerable work, but was absolutely necessary. The bestings or colostrum, which the cow secreted during this period, had a healthy effect on the bowels of the calf, and should be fed to it at a temperature of from 96 to 100 degrees. After 10 days, a little skim milk could be added to the dipt, the amount being gradually increased until at the end of a month the feed could consist of skim milk mixed with a little crushed linseed and pollard made into a gruel, of the consistency of two parts of linseed to one part of pollard. A full day's ration for a calf of (say) two months old, would consist of 10 lbs. of milk morning and evening and 1 lb. of gruel daily, together with 1 oz. of lime water, which would have the effect of neutralising the acidity of the stomach. A small quantity of salt could be added. This ration, gradually increased to meet the need of the growing calf, should be fed until it reached the age of 5 or 6 months. When necessary to wear, the calf should be turned out into a good grass paddock, and should be given one meal a day for the first week or so, but it was essential that the growth of the animal should receive no check. Weaning should take place when the heifer was from 12 to 15 months old, according to the breed and the stage of maturity. When weaning was commenced it was necessary to handle the beast carefully, she should learn the habit of making milk early. Even if she were only giving from 1 lbs. to 2 lbs. of milk, it was not advisable to dry her off until she had been in for eight months.

As to dairy cows generally insufficient care was exercised in ascertaining their milking value. The Babcock tester should be used on every farm where cows were kept for profit.

NEXT CONFERENCE.

After considerable discussion it was decided that the next Conference should take place at Quorn.


Morning Session, February 29.

POST-MORTEM EXAMINATION.

The Chief Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.), assisted by the Government Veterinary Surgeon (Mr. C. E. Loxton, M.C.V.S.), gave a practical demonstration of the methods adopted in making a *post-mortem* examination. Before commencing operations the Chief Veterinary Surgeon described the signs of health and disease in animals, more particularly in cattle. He described the fatal symptoms of tuberculosis, actinomycosis, mastitis, and hoven; and gave preventive measures. A cow was slaughtered, and the digestive, respiratory, circulatory, urinary, and generative systems were fully explained. The functions of the various organs were also dealt with. Advice regarding common ailments was tendered, and a number of questions were answered.

WOOL-CLASSING.

Mr. Henshaw Jackson (the Wool Instructor) gave a practical demonstration of a simple classification of farmers' clips. He lucidly explained the method adopted by the woolbuyer of ascertaining the value of a line of wool, and pointed out how careful attention to classing and get-up affected the estimate of the buyer.



AGRICULTURAL BUREAU REPORTS.

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* No report received during the month of February. † Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by GEORGE G. NICHOLLS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

Amyton, January 30.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. T. O'Donoghue (chair), W. Gum, J. J. Cormack, T. Ward, S. Thomas, A. Crisp (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Members were of opinion that the system at present in operation could not be improved upon by introducing the method of selling cattle by live weight, so far as this district was concerned.

Weighing Wheat in Bulk.—Members were unanimously of the opinion that the system of weighing wheat in bulk should be tried. It was thought that the weighbridges should be the property of the Government.

Arden Vale and Wyacca, February 5.

(Average annual rainfall, 16 in.)

PRESENT.—Messrs. J. H. Willis (chair), M. Echert, H. Lieblt, W. Fricker, J. Absalom, P. A. Hannemann, O. E. Hannemann (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—The proposal to institute the system of weighing wheat in bulk was duly discussed. The Branch did not think it advisable to adopt this idea until such time as the bags could be done away with altogether.

Selling Cattle by Live Weight.—It was thought that little, if anything, would be gained by the adoption of the system of selling cattle by live weight.

Farm Laborers' Blocks.—Members thought the proposal to survey small blocks in new hundreds for the purpose of providing holdings for farm laborers a good one, provided the blocks were not too far from the towns, and were not too large.

THE CROPS.—The average yield of wheat for the hundreds of Yarrah and Wyacca was estimated at 4 bush. per acre.

Carrieton, February 22.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. E. W. Radford (chair), F. Byerlee, F. Kraeger, F. Vater, G. Earle, and J. W. Book (Hon. Sec.).

DAY BIBLE.—It was reported that several serious losses of stock had been lately occasioned by the disease known as "dry bible." The prevalence of the trouble was causing much concern in the district.

Davenport, February 14.

(Average annual rainfall, 9 in.)

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—It was resolved that, so far as Port Augusta was concerned, no advantage would be gained from the introduction of the system of weighing wheat in bulk.

SILK AND SILKWORMS.—A paper on this subject was contributed by Mr. Bice, who traced the growth of the industry from its birth in China about the year 2640 B.C. The gradual dissemination of knowledge respecting the silkworm and the treatment of the fibre throughout Korea, Japan, India, Persia, and Central Asia was touched on; and the circumstances under which it was introduced into England were related. The cultivation

of mulberry trees for the sustenance of the worms was exhaustively dealt with. The moth of the silkworm laid from 3,000 to 4,000 eggs which would hatch here in July or August. These should be covered with a net through which the grubs were unable to force an exit. One person could manage 60,000 in a few minutes daily, covering a period of six or seven weeks. The principal point to be observed was to keep everything very sweet and clean. The worms should not be touched with the fingers. The little weavers never broke the thread, which, if taken from a good cocoon, should measure six miles. Spinning at an end the cocoons were put in a calico bag and placed in an oven with a temperature which, without scorching, was hot enough to destroy life. If left it would eat its way out to the damage of the silk.

Dawson, February 3.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. E. W. Smart (chair), T. R. Hughes, J. Wilson, P. H. Baker, G. Ferguson, J. Nottle (Hon. Sec.), and one visitor.

THE HARVEST.—A general discussion on the harvest was initiated by Mr. Ferguson, who said that only 3-17 in. of rain had fallen since his crop had been sown, but the returns were satisfactory, even although the wind and grasshoppers had been troublesome. Of the varieties of wheat he had tried, Lott's No. 2 was most profitable. Drought-resisting wheats were not successful. Le Huguenot was very thin and was affected by frosts, but he found it generally revived after a few showers of rain. Purple Straw was a good wheat; the grain was very plump, and it was the heaviest wheat he had had for years. Mr. Baker had secured the best results with Federation. A few acres of Bunyip which he had sown last year yielded well, and he intended giving it another trial.

PICKLING SEED.—Members generally agreed that it was not advisable to pickle seed-wheat if the ground was dry, but pickling with bluestone would prevent smut when the soil was at all moist.

Hookina, February 3.

PRESENT.—Messrs. P. Kelly (chair), F. Stone, J. Henschke, P. Murphy, J. Cam, T. Kelly, and D. Madigan (Hon. Sec.).

LAMB-RAISING.—Mr. J. Henschke contributed a short paper on this subject as follows:—"As the lambing season is now approaching it is an opportune time to exchange opinions on lamb-raising. A paddock should always be reserved for lambing ewes. Ewes should not be left alone during lambing, as besides the extra lambs reared the lives of many ewes are frequently saved if a person is looking after them. The ewes should always be driven to one place to camp of a night, as then the lambs have a chance of finding their mothers during the night. It also gives the person who is looking after them an opportunity of keeping eaglehawks away, as these are usually most troublesome early in the morning. I find strychnine the most effective means of getting rid of the eaglehawk. If there is a motherless lamb in the flock kill it, and while it is still warm poison it. I always put the poison in the mouth and on the shoulder, as the hawk usually eats this part. After a few hawks have been poisoned others will not come near the paddock." In discussing the paper Mr. P. Kelly pointed out that crows were quite as troublesome as eaglehawks when the lambs were young. Members generally agreed with the views expressed by the writer of the paper.

Mount Remarkable, February 7.

(Average annual rainfall, 21 in.)

PRESENT.—Messrs. L. A. Baner (chair), T. H. Caseley, N. S. Giles, W. Oldland, I. George, W. Foot, H. H. Davie (Hon. Sec.), and several visitors.

NOXIOUS WEEDS.—Mr. N. S. Giles initiated a discussion on the subject of the destruction of noxious weeds. He considered that owing to past neglect there would be much labor entailed in the future, as weeds had increased to such a great extent. There were some who made no effort to eradicate the pests, and made it bad for everyone. Now

that the district councils had charge of the work the ties of friendship and goodfellowship were too strong to allow of the councillors taking drastic action against their neighbors; besides, some councillors were such flagrant lawbreakers that they could not compel others to destroy the weeds. The work should be carried out by a central authority. The Advisory Board of Agriculture should have in hand the administration of the Act. Inspectors under the Act should not be allowed to live in the districts in which they operated. Mr. Oldland handed in a clipping from a newspaper, which stated that in New South Wales a false comb had been invented to attach to a stripper to bear down the weeds whilst the stripper, free from encumbrance, took up the grain. A crop which otherwise would have been abandoned had stripped at the rate of 16bush. to the acre. Mr. Caseley knew of one farmer in particular who had been defiant of the Noxious Weeds Act and his neighbor's seed was suffering in consequence. Star thistle country had been successfully treated in New South Wales with a system of fallowing. Mr. L. George thought that the weed on a landowner's property should be destroyed by the Government officers if the owner failed to comply with the Act, and then the cost should be charged to the defaulting landowner. Mr. Foot thought that a local body should be empowered to enter a property and destroy the weeds and charge the owner with the cost of destruction. Visitors thought that pressure should be brought to bear upon the landholders, but that pure hardship should be avoided. Also that it should be compulsory to destroy weeds at a given time; otherwise the seed would be scattered worse by the handling. The Chairman expressed the opinion that he saw the solution of the difficulty in conjunction with the land laws; but until the land laws were altered to apply to the case the suggestions brought forward would be good. Mr. Giles submitted the following motion:—"That it is advisable that the administration of the Noxious Weeds Act be vested entirely in the hands of the Advisory Board of Agriculture, and that any inspector appointed to enforce the board's regulations shall live away from the district in which he operates." The motion was carried; and it was resolved that it be sent on to the Advisory Board of Agriculture with the request that they should consider the possibility of recommending the Government to take action agreeable to the motion.

Quorn, February 3.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. J. McColl (chair), Cook, Britza, Noll, Bury, Schulze, Brewster, Havelburg, Thompson, and Patten (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—It was decided that the Branch should not support the proposal to institute the system of weighing wheat in bulk, as the time was not yet ripe for the change. Mr. Noll pointed out that the bridge would not be just where the farmer required to unload his wheat, and it would still be necessary to take the bags off singly.

Wilmington, January 31.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Hannagan (chair), Hill, Jacobs, Slee, George, McGehee, Jericho (Hon. Sec.), and one visitor.

BUNT.—This subject was dealt with in a short paper by Mr. Hannagan in which he pointed out that he attributed bunt to (1) stripping the wheat before it was properly ripened; (2) carelessness in pickling; (3) the use of inferior bluestone; (4) the use of a solution not sufficiently strong; (5) the prevailing climatic conditions. Seed sown on low-lying land was more susceptible to the disease than seed on higher ground, and trouble was more likely to be experienced with damp sowing. Not only did bunt reduce the yield of wheat, but it depreciated the value of the crop and spoiled it for hay. As a precaution against the trouble it was advisable to clean seed wheat and so rid it of all bunt balls, chaff, and spores, and then pickle on a good clean floor or a large case, using about 5ozs. to 6ozs. of the best bluestone to one bag. Sufficient warm water to damp the grain was all that was necessary. A greater quantity would damp the bluestone and make the wheat sticky and difficult to run through the drill.

Wirrabara, January 6.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. P. J. Curnow (chair), P. and H. Lawson, W. Bowman, S. Thistleton, J. Kendrick, W., E. J., and W. H. Stevens, A. E. Stott, W. Marner, E. F. Kavanagh, J. F. Pitman, C. H. Curnow, G., E. C., and J. Hollett, C. F. H. Borgas, A. R. Woodlands (Hon. Sec.), and several visitors.

USEFUL BIRDS.—Mr. C. H. Curnow read a paper in which he pointed out that the starling was useful, in so far as it destroyed large numbers of grubs and similar pests. In the drier parts of Queensland squatters had found it necessary to give up keeping sheep on account of the ravages of tick, but since the starlings had increased to such an extent the trouble had almost entirely disappeared. The magpie to a large extent subsisted on grubs, caterpillars, worms, &c., and in this way did considerable service to the agriculturist. The thrush, wagtail, and swallows were also insectivorous birds. The curlew fed on insects which were active during the night, and the mopoke, which fed on smaller birds such as minahs and wattle birds, thus prevented a too great increase in their number. Although the eagle might be responsible for loss at lambing time, the vast number of rabbits destroyed by this species must surely counterbalance at least any loss it occasioned. In this connection the writer also mentioned that the iguana was very useful as a destroyer of rabbits, as it would go into the burrows and kill the young. A good discussion followed the reading of the paper. One member stated that the Birds Protection Act had done more good than any other recent Act of its kind.

LUCERNE-GROWING.—Members generally agreed that if the soil was suitable lucerne-growing could be successfully carried on in the Wirrabara district.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, February 27.

PRESENT.—Messrs. A. H. Jacobie (chair), Curtin, Bartrum, Ryan, Bartrum (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—The proposal to substitute the system of weighing wheat in bulk for that in present in vogue was duly considered. Members decided to support the change.

Georgetown, February 24.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. P. Higgins (chair), M. J. McAuley, J. Myatt, J. Higgins, J. Fogarty, R. J. McDonald, P. T. Hill, A. Erickson, and S. Eyre (Hon. Sec.).

JOURNALISM AND AGRICULTURE.—The following paper was read by Mr. M. Thompson:—"Farmers, as a rule, are very apt to place their own experience on their own farms before that of anyone else, no matter how much experience the other has had. Each farmer should know something about local conditions and the requirements of the land in his own district; but he will find that he can sometimes find out a lot about his own district by reading about others. Practical farmers know that by reading articles on all branches of farming they learn a considerable amount, and the *Journal of Agriculture* is a publication from which a lot of information can be gathered. Lectures and practical demonstrations are given by able men all over the world, and those that listen or look on at the time are not the only ones to benefit. The daily papers are always eager and willing to take up anything that is brought up for discussion, and the results of experiments are soon known far and near. Sometimes a man, by sitting down to read for half an hour, learns something that another has spent half a life-time in finding out. It is hard to estimate the value of printed reports on the selection of seed wheat, artificial manure, and the working of soil. Through the papers and journals the farmer gets the benefit of the experience of others. He can read it at his own time, and think over it when he is at work, and perhaps

apply it in his own way at home. Visitors to this State often admire the system of the Agricultural Bureau, the meetings of the farmers, and the *Journal* that reports the discussions of one branch to the others. Too much cannot be said of the way the *Journal* reports the Agricultural Bureau Congress meetings and the value of the reports to those who cannot attend, as well as to those who do."

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—It was thought that the adoption of the system of weighing wheat in bulk would be an improvement, and the Branch decided to support the proposal.

Selling Cattle by Live Weight.—Provided a practical and reasonable scheme was suggested, members thought the institution of the system of selling cattle by live weight would be well worth a trial.

Mount Bryan, February 19.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. J. Hatherly (chair), Wardle, Schmidt, Trallagan, and H. L. Hatherly (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—This proposal commended itself to members as being likely to be a change for the good, and they decided to accord it their support.

Farm Laborers' Blocks.—The suggestion that the Government should survey small blocks in new hundreds to provide holdings for farm laborers did not meet with the approval of the Branch.

Weighing Wheat in Bulk.—Members considered that, in view of the fact that weighing bridges were so liable to get out of order, the system at present in operation was better than that of weighing wheat in bulk.

Port Pirie, January 13.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. Welch (chair), Munday, Johns, Dick, Hawkins, McEwin, Birks, A. M. Laurie, Greig, Eagle, and Wright (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—The Branch decided to support the proposal to introduce the system of weighing wheat in bulk.

Selling Cattle by Live Weight.—Members thought the adoption of the system of selling cattle by live weight would be a good idea, and agreed to afford it their support.

Farm Laborers' Blocks.—It was thought that the erection of cottages on the farms for the working men would better serve the purpose than the surveying of small blocks in new hundreds to provide holdings for farm laborers and so induce them to settle amongst the farming community.

ANNUAL REPORT.—The Hon. Secretary presented his annual report, in which he pointed out that during the year 10 meetings had been held, with an average attendance of about 10 members. Papers dealing with "Features of 1910," "Increasing the Profits from the Farm," "The Garden on the Farm," "Grading Wheat," "Farm Pests," "Farm Horses," "Shelter for Farm Stock," and "Improved Methods of Agriculture" had been read and discussed, and two homestead meetings were held.

WHEAT PRODUCTION.—The following paper was read by Mr. D. McEwin:—"Not many years ago, when wheat was 5s. a bushel, it was argued that it would never go back much below 4s. a bushel, because the world had reached its limit in wheat production, and all Australia grew would not make any difference. Foreign countries were taking to flour and the increasing population would all tend to keep the price of wheat up," it was said, but that argument has been proved false. No doubt at the time it looked as if there was something in it. However, the saying that Australia makes no difference to the price of wheat always appears to me as being peculiar. I say it does, and before many years will make a greater difference. It will not keep the price down, but will tend to keep it easier. Failure of crop is the only thing to keep the price up. Not many years ago it was thought that all the land of any use was taken up, and young men were leaving South Australia for the other States. At the time there was a cry as to what we should do with our boys. At present we can well say Where are our boys? A few years ago, with good cultivation, manures, and seasons, farmers were reaping 30bush. and 40bush. an

acre and were of an opinion they could still go on and get 60bush. or more, but we do not hear of this at present, except in favored places. When Pinnaroo was opened up people were of divided opinion as regards its capability. In 1907-8 it produced 178,000bush., and the production went on increasing until in 1910-11 it produced 1,580,000bush., or an increase to nearly nine times as much in four years, and more wheat went into Lameroot than into any other station in South Australia. This year it had a set-back, owing more to bad cultivation than to the absence of rain; but as the people there put it, it would be all right if they had the rain. This country, I am satisfied, has a great future, and in time to come will be the largest farming district in South Australia. The country from the Pinnaroo line, across to the proposed Butcher's Rock Hole to Brown's Well line, I am certain will produce more wheat than one railway line will carry from Tailem Bend to Adelaide, and I consider it will be necessary to find an opening from Tailem Bend to a seaport, either by water, which I believe can be done by cutting a canal, or by building an extra line. Tailem Bend will be the town of the South. The price of wheat will rise and fall, according to prospects, failures, and storms. The acreage under wheat will go ahead by leaps and bounds. Averages will vary, and we can work the land as we like, but there are two things essential in wheat production, viz., the weather and the rainfall at the right time." In commenting on the paper, Mr. Greig referred to the excellence of South Australian wheat. It was better than Argentina. He believed that the world could produce a much larger quantity of wheat than at present if it was required. Mr. Munday said that under present conditions a fair return for wheat should be about 4s. per bushel. In regard to the Pinnaroo country, the fact should not be lost sight of that the figures quoted by Mr. McEwin for 1910-1911 season were the returns on an exceptional year. The country had responded remarkably well, owing to the very wet season, but with a deficient rainfall there would probably be a considerable falling off in the returns. The State should in future keep the average yield of wheat at about 10bush. per acre. He failed to see how big prices would be obtained for wheat in the near future in spite of the fact of an increasing population. South Australia took credit for producing the best wheat in the world, but from a baker's point of view it did not turn out so well as some foreign wheats, such as Russian Red and Manitoba No. 1. The value of our wheat would be considerably enhanced if more trouble were taken to clean it properly. Mr. Johns said he was not so optimistic in regard to the future of the Pinnaroo country. Mr. McEwin, in replying, spoke in glowing terms of the prosperity of the district and predicted a bright future for the settlers there. The soil was splendidly adapted for the growing of fruit and vegetables. The main drawback at present was the absence of railways, which made it necessary to cart wheat and other produce long distances by road.

Redhill, February 20.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. J. Pilkington (chair), G. Cox, S. H. Lines, L. Trewren, P. H. Wheaton, J. Prevost, J. Potts, J. Treloar, F. H. Wheaton (Hon. Sec.), and two visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—The proposal to introduce the system of weighing wheat in bulk was duly considered. Members agreed to support the proposed change, and suggested the advisableness of installing two weighbridges, one on which loaded wagons could be weighed and one for unloaded wagons, at the busy wheat centres.

Farm Laborers' Blocks.—Members thought a more practical scheme in this regard was for the farmer to build a cottage for his laborer, and allow the latter an area of, say, 20 acres.

Selling Cattle by Live Weight.—The proposed introduction of the system of selling cattle by live weight was duly discussed. Members agreed that the change would be for the better, and decided to support the proposal.

Whyte-Yarcowie, February 3.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. Look (chair), F. Mitchell, J. E. Hunt, Pegree (2), Ward, Robinson, and G. F. Jenkins (Hon. Sec.).

HARVEST REPORT.—So far as the yields of wheat in the district were concerned, Federation, generally speaking, again proved its superiority over other varieties. In some

cases frost caused considerable damage, more particularly where the crops were thick and heavy; while on the red land, where wheat was much thinner, no damage was done. One member reported that in the case of his crop wheat sown unpickled yielded a return of quite 3bush. more per acre than that pickled with bluestone,

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

Angaston, February 3.

(Average annual rainfall, 21½ in.)

PRESENT.—Messrs. Sibley (chair), Plush, Giles, Friend, Ball, Player, Swann, Thorne, and Matthews (Hon. Sec.).

HOMESTEAD MEETING.—Members were conducted over Lindsay Park by the head gardener, Mr. Matthews. Considerable interest was evinced in the gardens, and the hot and shade houses called forth the laudatory comments of all.

INTENSE CULTURE.—Mr. S. Plush contributed a paper in which he discussed the question of the acreage required for a person to make a living in the Angaston district. He said—“It is very hard to make a definite statement on this subject. So much depends on the knowledge, skill, and character of the individual. Taking for granted that the would-be gardener possesses the requisite qualities, a comfortable living could be made on 10 acres of good land. Of this, nine acres might be planted with peach trees; I choose these trees because they come earlier into bearing and the fruit is gathered with little trouble if the trees are properly shaped. These trees should be planted 24ft. apart, which allows 74 trees to the acre. Nine acres would give room for 666 trees. With regard to the preparation of the soil, it is necessary to plough early to a depth of about 5in., and work up thoroughly with the scarifier till planting time. I do not favor early planting, as ground should be in thorough order before trees are planted, and if a wet winter follows ‘ring rot’ is likely to destroy many trees. About the end of July is a most suitable time. The hole should not be more than about 12in. or 15in. deep, according to the size of the tree. It is not wise to make the hole too deep, as the tree may become water-logged if the subsoil is retentive. The size is determined by the owner’s energy—the larger it is the better. Two pounds of super. should be given to each tree, as the start is all-important. With thorough tillage, systematic pruning, and constant attention to spraying, these trees would come into full bearing in about five years. Different methods of cultivation must be used according to the quality of the soil. A stiff soil is greatly improved by green manuring. Too many varieties are to be avoided. I recommend Salway and Elberta. Both are canning kinds, while Elberta is a good drier: it is large, and ripens in February. Clingstones are coming into favor, but my experience is not sufficient to speak with certainty about their value, and probably they may not be so prolific as the freestones. The remaining acre of ground could be devoted to the growth of summer vegetables, such as tomatoes and cucumbers. These would provide a return while the gardener was waiting for the trees to come into bearing. Tomatoes should be planted as early as possible. Seed should be sown in boxes placed on hot beds of stable manure. When plants appear they should be hardened off by being placed in the open air, but care must be taken to protect them from frost during the night. By this means the plants should be strong enough to plant out by the end of July. As the young plants are placed in the open they should be protected from frost and hail by means of kerosine tins cut diagonally, the half being placed on S.W. side with a slight cant. This gives sufficient shelter till danger from frost is past. Now for the financial aspect. The outlay would be as follows:—Ten acres at £25, £250; shanty, £40; windmill, &c., £41; horse, £30; plough, £3; Planet jun., £2 10s.; spray pump, £8; materials, £10; manures, planting, £2; miscellaneous, £5; 666 trees at 8d., £22 4s. Total, £413 14s. So far as the returns from the vegetables are concerned, it is well in such cases to speak from actual experience. Fortunately, I can quote from a case within my own knowledge. Two young friends of mine obtained 30 to 40 cases of tomatoes per week for eight weeks from half an acre. These yielded a total of £80. From cucumbers, &c., on another quarter of an acre they got 80doz. a week, which at 6d. a dozen works out at £2 per week, or a total of £16, making altogether £96. The expenditure

is practically trifling. Besides this, in the third year the peach trees would return probably about 6d. a tree—£16 13s. By the fourth year this would be doubled—£33 6s. The total return for the first four years would be £96 by 4—£384, added to return from trees £50, making a total of £434, or an average of £108 per year. Against which there is the annual interest charge of £21 on an outlay of £413 odd. This would leave an average of £87 for living expenses, or about £1 13s. 6d. per week. In the fifth year, when the trees came into full bearing the vegetables might be abandoned. The 666 trees would yield on an average two cases each, which at 4s. per case would give an annual income of £266 8s. The grower would then be fairly launched on a prosperous career, and might think of taking a helpmate." The paper was well discussed.

Mallala, February 5.

(Average annual rainfall, 16½ in.)

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Due consideration was given the proposal to institute the system of selling cattle by live weight with the result that the idea did not commend itself to members.

Farm Laborers' Blocks.—The suggestion to survey small blocks to provide holdings for farm laborers in new hundreds received favorable consideration from members, who, however, thought that the blocks should be restricted in area to 100 acres at the outside.

Weighing Wheat in Bulk.—Members unanimously decided to support the proposal to substitute the system of weighing wheat in bulk for that at present in vogue.

Riverton, February 28.

(Average annual rainfall, 20½ in.)

PRESENT.—Messrs. W. B. Davis (chair), R. H. Cooper, W. Stacey, J. P. Schultz, J. W. Kelly, T. Longbottom, A. Hannaford, A. F. Kemp, E. A. Gray (Hon. Sec.).

LUCERNE-GROWING.—The following paper was read by Mr. J. P. Schultz:—"The growing of lucerne has received considerable attention of late, as the people are getting to realise its enormous value. To grow it with anything like success there must be an abundance of moisture. Where there is not much moisture in the summer months some people cannot grow this valuable fodder, and that which has been grown has mostly been irrigated. Even with a fair supply of water the difficulty is how to get it high enough to obtain sufficient pressure at a payable cost. Intending growers should give a good deal of thought to the water question. The best soils for lucerne-growing are coarse, loose ones. Lucerne thrives best on very deep rich soil. Once properly established it is one of the hardiest plants known, and will last for quite a number of years without resowing. No labor should be spared in preparing the soil. The ground should be well manured, ploughed with the first rains, harrowed down, and should then receive another dressing of manure. The best time for sowing depends largely on the time the ground was prepared. The end of August, if not too frosty, is a suitable time. If wire weed makes its appearance it should be pulled up at once, as it will soon choke the young plants. Lucerne should not be watered in the early stages of its growth, as it is essentially a summer plant, and its roots should be encouraged to go downwards. Do not start watering until the plant has commenced to grow. If a windmill is used it is necessary to have large storage tanks, as the mills cannot always be depended on for a supply. Engine-power is much better if it can be had; but intending growers should consult someone who has had experience before setting up a plant. To irrigate one acre of lucerne 30,000 galls. of water are needed to grow one crop. Overhead sprinklers are the most satisfactory. It is an advantage to have soil that the water will soak into and not run to the lower lying levels. When laying pipes it is desirable to have the taps at equal distances from each other, so that the water will reach all over the plot. The pipes should be 9 in. underground, and the tap pipes should be not less than 2 ft. high, so that they are not lost sight of when the crop is being cut. It is hard to lay down any particular rule as to when to cut lucerne. Some growers recommend cutting as soon as the bloom appears. When the crop has come to a standstill through insufficient moisture it is advisable to cut it and start watering again, or if new growth shows at the bottom and the old is not in bloom cutting should be commenced. With good management a plot should return about six cuts the second year, providing it received sufficient moisture. Night watering is better than day watering,

because on a hot, windy day the young growth is likely to be burnt off. Day watering hardens the ground and so prevents the young growth forcing its way up. If, as a result of watering during the day, the young growth is burnt, it is advisable to cut the crop and allow it to start afresh."

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Paskeville, February 1.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. J. P. Pontifex (chair), A. Goodall, T. R. Brinkworth, T. M. Forbes, R. Disher, W. J. Drewitt, S. R. and T. H. Price, and C. L. Palm (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—Mr. Goodall moved that this Branch should support the proposed establishment of the system of weighing wheat in bulk. There were several advantages to be gained by the producer where the load was weighed instead of each bag singly. The merchant could not lose anything. The wheatbuyer, when purchasing, only wanted a fair deal, and this applied to the farmer when selling. He had, when carting wheat, often seen the agent have to assist the lumper, because behind him were a number of loads to be taken off, each one tired of waiting and in a hurry to get back, in some cases having travelled a long distance. The agent was then not in a fit condition to attend to his clerical work. This would be largely obviated, and a saving of time effected were the proposed system in operation. When ascertaining the weight the buyer adjusted the fractions of pounds by give and take; but it would be preferable to both parties concerned if the correct weight could be obtained, and this in one operation. Mr. T. Forbes, in seconding the motion, said he could indorse the remarks of the mover. On a windy day, especially round the wheat stacks or sheds, the wind would render it almost impossible to obtain a correct balance, and it would certainly not be wise on the part of any agent to mark a heavier weight than the actual, as if such a thing occurred he would have to risk the loss when weights were checked at the depot or ship's side. Mr. T. Brinkworth said that the advantages to be gained should warrant the attempt at bringing about the desired change. The proposal was duly carried.

Pine Forest, February 2.

(Average annual rainfall, 13 in.)

PRESENT.—Messrs. D. Carmen (chair), S. Barr, A. Nelson, C. Schultz, H. Hewett, and R. D. Goodridge (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—The proposal to introduce the system of selling cattle by live weight was discussed, and members decided not to support the change.

Farm Laborers' Blocks.—Members thought that it was advisable for the farmer to provide a cottage and, say, 30 acres of land for his laborer. It was thought that the proposal that the Government should survey blocks in new hundreds for the purpose of providing laborers with holdings was a good one: but 100-acre blocks were too large.

Weighing Wheat in Bulk.—Mr. Nelson had more than once had tangible cause for dissatisfaction with the weights registered for wheat under the present system of weighing, and the Branch decided to support the suggestion to introduce the system of weighing in bulk.

MANURIAL AND VARIETY EXPERIMENTS.—Members of this Branch have been conducting some very useful experiments in connection with wheat-growing. Mr. C. Schultz had sown four 2½-acre plots with different quantities of manure and seed, and the following results should prove interesting. The variety of wheat sown in each case was Silver King. Plot No. 1, 66lbs. super., 50lbs. seed, yielded 24bush. 13lbs.; plot No. 2, 65lbs. super, 70lbs. seed, yielded 28bush. 56lbs.; plot No. 3, 112lbs. super., 70lbs. seed, yielded 29bush. 25lbs.; plot No. 4, 85lbs. super., 50lbs. seed, yielded 29bush. 22lbs. Mr. S. Barr's results were as follows:—11½ acres, manured with 60lbs. Wallaroo super. and 20lbs. ammonia, yielded 14bush. 56lbs. per acre; 11½ acres, manured with 80lbs. Wallaroo super. and 20lbs.

ammonia, yielded 16bush. 15lbs.; 9 acres, manured with 80lbs. Wallaroo super. and 20lbs. potash, yielded 15bush. 20lbs.; 9 acres, manured with 60lbs. Wallaroo super. and 20lbs. potash, yielded 14bush. 20lbs.; $2\frac{1}{2}$ acres, manured with 100lbs. Wallaroo special super., yielded 16bush. 43lbs. The variety in each case was Yandilla King, sown at the rate of 60lbs. to the acre. A crop of 65 acres of the same variety sown between the 9th and the 15th of May, at the rate of 60lbs. of seed to the acre, with 80lbs. super., yielded an average of 14bush. 50lbs. per acre. Variety tests were conducted by Mr. Barr also; 16 one-acre plots were treated with 100lbs. of Wallaroo standard super. and 60lbs. of seed. The following yields resulted:—Yandilla King, 11bush. 44lbs.; German Wonder, 15bush. 58lbs.; Marshall's No. 3, 13bush. 55lbs.; Nhill, 14bush. 8lbs.; Comeback, 14bush. 35lbs.; Gluyas, 17bush. 1lb.; Silver King, 12bush. 25lbs.; Baroota Wonder, 13bush. 26lbs.; Dart's Imperial, 11bush. 56lbs.; Atlanta, 12bush. 32lbs.; Comeback, 12bush. 6lbs.; Gallant, 13bush. 10lbs.; Phillis Marvel, 12bush. 52lbs.; Federation, 13bush. 46lbs.; Petatz Surprise, 16bush. 8lbs.; College Selection, 16bush. 39lbs.

WESTERN DISTRICT.

Butler, January 24.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. J. Young (chair), Phillis, Bowden, Hill, Morison, Easther, Jericho, and Barr (Hon. Sec.).

WHEAT FOR DISTRICT.—A discussion took place relative to the merits of different varieties of wheat in so far as this particular district was concerned. Members generally favored the following varieties:—King's Red, King's White, Gluyas Early, and Yandilla King.

VARIETY TESTS.—Mr. R. W. Barr (Hon. Sec.) had been testing 12 varieties of wheat, with the idea of comparing the yielding qualities. The land had been divided into three-acre plots, and was sown on the 14th, 15th, and 16th of June with 1bush. of seed and 60lbs. of super. The yields were as follows:—

Yandilla King	4bush. 14lbs.	Taragon	2bush. 2lbs.
Jade	6bush. 5lbs.	Zealand Blue	3bush. 26lbs.
World's Wonder	5bush. 26lbs.	Bobs	5bush. 4lbs.
John Brown	3bush. 37lbs.	Federation	4bush. 44lbs.
Gluyas	9bush.	King's Red	7bush. 44lbs.
Comeback	4bush. 28lbs.	Huguenot	1bush. 25lbs.

Cummins, December 2.

PRESENT.—Messrs. Sabey (chair), Nottle, Norsworthy, Hancock, and Durden (Hon. Sec.).

MALLEE SHOOTS.—Mr. Norsworthy contributed a short paper dealing with the destruction of mallee shoots, for which purpose he recommended the use of an angle-iron roller with ribs about 8in. apart, with the edges sharpened to cut off all broom and undergrowth. It was necessary to roll early, September being a most suitable time, so as to enable the young shoots to get a good start before the burn. Ploughing to a depth of about 2in. should be begun directly there was sufficient rain to put the ground in good condition for working. This should be sown at the rate of, say, 60lbs. to one acre. If the stubble was not thick enough to secure a good burn, it could be broken down and fire raked crossways. The wheat crop could be followed with a crop of oats, and the stubble treated similarly to the wheat stubble. This should result in the destruction of a greater part of the shoots without any cutting. The method was much cheaper and quicker than that of using the plough as a grubbing machine. Members generally agreed with the views expressed by the writer of the paper.

Miltalie, February 3.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. J. P. Storey (chair), J. W. and E. Storey, F. Jacobs, A. R. S. Ramsey, and W. E. Heir (Hon. Sec.).**QUESTIONS FROM CONGRESS FOR OPINION.***Weighing Wheat in Bulk.*—The proposal to institute the system of weighing wheat in bulk was duly discussed. Members did not favor the idea.*Selling Cattle by Live Weight.*—It was thought that where a weighbridge was available the selling of cattle by live weight would be an improvement on the present system.**Utera Plains, February 3.**

(Average annual rainfall, 14 in.)

PRESENT.—Messrs. A. Ramsey (chair), A. and C. Venning, G. and H. Hornhardt, N. Guidera, M. Hunt, G. Bilney, F. Braunack, J. Abrook, and R. Hill (Hon. Sec.).**QUESTIONS FROM CONGRESS FOR OPINION.***Selling Cattle by Live Weight.*—The proposed introduction of the system of selling fat cattle by live weight was not favorably viewed by members, who thought little (if any) good would result from the change.*Farm Laborers' Blocks.*—The idea of surveying small blocks in new hundreds to provide holdings for farm laborers was considered. Mr. Venning did not favor the proposal, but thought farmers should provide houses on their farms for labor which they required. The laborer should receive a wage and also a percentage of the profit from the farm. Members generally agreed with this view.*Weighing Wheat in Bulk.*—It was thought that no benefit would result from the introduction of the system of weighing wheat in bulk, and members decided not to support the change.**EASTERN DISTRICT.**

(EAST OF MOUNT LOFTY RANGES.)

Forster, February 3.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. W. Searle (chair), J. G. and H. Searle, C. Hayman, C. Payne, and W. J. Sears (Hon. Sec.).**QUESTIONS FROM CONGRESS FOR OPINION.***Farm Laborers' Blocks.*—The proposal to survey small holdings for farm laborers in new hundreds was discussed. Mr. Hayman thought that if an area of about 25 acres was provided the blockholder could keep a cow and a few fowls. Other members thought a better proposal was to pass legislation compelling the farmer employing a married couple to supply them with suitable house accommodation.*Weighing Wheat in Bulk.*—The suggested substitution of the system of weighing wheat in bulk for that at present in vogue was duly considered. Members decided not to support the change, as they found it necessary to cart their wheat to different landings.**FARMING IN NEW COUNTRY.**—This subject was dealt with in the following paper by Mr. R. Whitfield:—"It is very bad policy for anyone commencing farming to buy old land, as there is usually too great an expense attached to this method for the average beginner to cope with. I would suggest taking up land from the Government in some of the hundreds which are now being opened up. As regards capital for starting on new land, if a man has from £150 to £200 in cash, or half in cash and the remainder in horses and implements, he is in a position to start on his own account. The first thing to do on a new farm is to clear the land, and the most economical as well as the most effective way of doing this is with the axe. Although much slower than the roller, it is cheaper in the long run. One man with an axe can clear as much in from four to six months as he can manage to put in the first year. I believe in early clearing so as to have the scrub as dry as possible for burning. Where a man gets land in April or May he has from five to six months in which to get it ready for the fire. By this it is harvest time, and by working for others he can earn enough with which to procure seed wheat for his first crop and horsefeed. I am in favor of fairly early sowing on new land. April

or May is the best month, as if put in later than this the plant does not get a fair chance to stool out. I consider from $\frac{1}{2}$ bush. to 1 bush. per acre is ample for the ordinary class of land about here. Ploughing the land first to a depth of 3 in. to 4 in., and then either harrowing or drilling the seed in is advisable. In this district, where the rainfall is so uncertain, I would not use super. In a good season it may answer all right, but with a year such as this, on anything like good sandy soil, super. is a complete failure.

Monarto South, February 3.

PRESENT.—Messrs. A. P. Braendler (chair), R. E. Anders, A. Harper, H. Frahn, C. F. Altmann, E. and G. J. Hartmann, F. C. Thiele, Geo. and H. Patterson, A. Schenscher, J. Daly, H. E. Kuchel, and C. Hill (Hon. Sec.).

CARE OF IMPLEMENTS AND MACHINERY.—The following paper was contributed by Mr. Thomas:—"Every implement should have a shed or place in a shed provided for it when not in use. Any machine that is left out in the weather for months at a time and exposed to heat and rain soon becomes weather worn. After an implement has done its first season's work the owner should, when stowing it in its proper place, see that it is in order, and if there are any defects he should make a note of them, or if convenient, it is better to have such defects repaired at once. Then he knows that his machine is ready for the next season's work. With such implements as the stripper or harvester, where belts are used, the belts should be removed and have a little oil rubbed on them and be put away in a cool place. The seed drill is an implement that requires a lot of care. A little extra attention will often save two or three days' delay. This implement has many cogs, and most of them are bevelled, the greatest care should be taken when starting the drill. When oiling, the user should always try the gear before starting the horses, and if it does not run lightly it is advisable to examine the feeders. Probably some of them will be found clogged and will need a little cleaning. Always carry a canvas cover over the hopper to keep out rain and damp. Such implements as ploughs, harrows, cultivators, etc., which are of iron do not require a shed so much, but a little paint put on them from time to time will preserve the iron and keep it from rusting. It is essential that all nuts are kept tight, as a loose nut will often cause some part of the implement to become strained. Any part that has once been twisted or strained, even though it is straightened again, is never so strong as it was in the first place. Plough mouldboards should be greased when not in use, as this will prevent them rusting and they will be freer in the soil. All implement sheds should, if convenient, be built so that it is an easy matter to push the implements into them without the aid of horses. A floor with a gentle slope back is preferable. When the implement is wanted for use a horse or two can be attached to it to haul it out."

DAIRYING.—Mr. R. E. Anders read a paper in which he pointed out that good cows were essential factors in successful dairying. A liberal supply of the best of food should be provided, and regularity of milking must be observed. The Shorthorn, Ayrshire, and Jerseys were the breeds which he recommended. The first-named would usually return a good price if it was necessary to sell as fat stock, as this breed possessed a large frame. The Ayrshire generally was a good yielder. For cream the Jersey was the most suitable cow to keep. The selection of the bull was an important matter to the dairyman.

Parrakie, February 24.

PRESENT.—Messrs. F. J. Dayman (chair), A. J. Beelitz, O. and C. Heinzel, W. Threadgold, M. F. Lee, F. W. Randall, A. C. Hamiester, F. W. Gravestocks, A. F. Dayman, A. C. G. Hammond, J. G. Temby, M. J. Kilder, N. Good, H. Deiner (Hon. Sec.), and three visitors.

WHEAT-GROWING.—The Hon. Secretary read an extract from an American paper, setting out the results of experiments, which proved that land ploughed to a depth of 7 in., and well cultivated, returned a larger crop of wheat than similar land not ploughed so deep. The article also emphasized the necessity of following early. In the discussion which followed, Mr. N. Good said he did not believe in deep ploughing any more. He would never plough to a depth greater than 4 in. at the outside. The main thing was to work the land well after fallowing, and keep on working it. Farmers did not work their land enough after fallowing. He had about 20 acres in crop last year that was ploughed twice, and it grew a lot better than the balance of his crop, and he burnt the stubble without the aid of a fire rake. Mr. Hammond had tried deep ploughing and found it was much

harder on the horses and did not pay. He would not plough to a depth of more than 4in., and, if possible, would work it afterwards with the cultivator or disc. Mr. J. Temby thought the conditions in America were much different from those of South Australia. He did not favor ploughing too deep. Land should be well worked and sown just deep enough to bury the seed. Mr. F. J. Dayman preferred early fallowing to a depth of 4in. or 4½in. worked up as much as possible, with the seed sown about 2in. deep. Mr. Lee did not think deep ploughing was suitable, except where there was a good rainfall. He had seen it tried on a 7in. rainfall and it was a failure. He would not plough more than 3in. deep, but would work the soil down as fine as possible. Good crops could be grown on a light rainfall in this way. The Chairman favored deep ploughing, but it was essential to work it well. The deeper it was worked and the oftener the better crop it would grow. Messrs. Beelitz and Threadgold considered 4in. deep enough to plough, and favored working as much as possible afterwards.

OATS V. WHEAT.—The following paper was read by Mr. Gravestocks:—"It would pay farmers to sow more land with oats than they do at present. Although oats are more trouble to harvest than wheat, they will grow on the sandy rises in this district, where wheat will not do very well. This is a great consideration where there are mallee shoots to deal with, as the stubble burns well, and two good stubble burns just about destroy the shoots. Oats have been proved a good crop to grow where 'takeall' is troublesome. Oat stubble is better than wheat stubble for a feed paddock. Oats should be sown early. April is a good month. A farmer should sow just as large an area as he can harvest, bearing in mind that oats is a crop liable to 'shake out'. Last harvest my wheat averaged 10bush. to the acre, and the oats 20bush. This year the oats return was again double the wheat average. Taking the value of wheat at 3s. per bushel, and the value of oats at 2s. per bushel, a profit of 10s. an acre is shown in favor of the oats. Algerian oats are most suitable for this district, as they are good for both hay and grain." Members generally agreed with the views expressed by the writer of the paper. Mr. Temby said a farmer might sow up to one quarter of his crop with oats, as they saved a large amount of bran and pollard, made good hay, and resisted takeall. The Chairman said a plan that had been successfully adopted by several farmers in the district was to sow wheat on fallow, and then sow oats on the stubble the following year.

Wilkawatt, February 3.

PRESENT.—Messrs. Ivett (chair), W. J., D. F., and D. Bowman, H. Harvey, H. F. and O. Ahrens, J. W., G. A., and F. W. Altus, C. Schulze, T. Sorrell, A. J. McAvaney, W. R. Neville, M. Hoye, W. J. Tylor (Hon. Sec.), and four visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Due consideration was given the proposal to institute the system of selling cattle by live weight. The Branch could not see that any practical benefit would follow the change.

Weighing Wheat in Bulk.—The suggested substitution of the system of weighing wheat in bulk for that at present in vogue was duly discussed, and as a result the Branch decided to afford the movement its support.

Farm Laborers' Blocks.—The idea of surveying small blocks in new hundreds to provide holdings for farm laborers commended itself to members, who thought that much practical good should result from the adoption of the proposal.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, January 30.

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. S. Chapman (chair), T. Jacobs, C. Ricks, J. Lewis, H. Jacobs, J. Tozer, H. Lewis, S. H. Carnow, (Hon. Sec.), and one visitor.

IRRIGATION IN THE HILLS.—The following paper was read by Mr. C. Ricks:—"In this district we have a splendid climate, free from the heavy frosts that are experienced in many parts of the Mount Lofty ranges, such as Echunga, Mount Barker, and other places. We can grow the strawberry, the orange and the lemon, apples and pears, potatoes and cabbages to perfection. The land is splendid for the growth of summer and winter

fodder for cattle, and the market is within 20 miles. Another advantage is that there is a supply of good water at a reasonable depth from the surface, but it would strike a visitor coming into the district that man had done little to assist nature to produce its best. On some of the land, one can see even in the driest summer, beautiful fresh water bubbling to the surface, and running away practically to waste. There is a good supply of water on nearly every section in the district at a depth of 50ft. to 100ft., and that is very shallow; sinking if we compare it with the depth they sink for water elsewhere. Many of our dairy farmers and gardeners sink wells or put down bores for a depth of from 300ft. to 400ft.. The question arises, Will it pay to go to the expense that the above would entail? I say, "Yes," and in giving this answer, I am giving it from personal experience. Take the summer months like the present; our ordinary land without water is practically barren from December to March or April, but with the aid of water this is the best season to grow fodder crops for cattle. As everyone knows, nearly all fodder crops grow best when the air and land are warm, provided sufficient moisture is available; the same remarks apply to potatoes; we have grown more potatoes this summer than ever before. We have them at present in different stages of growth, some just coming through the ground, others ready to dig, all grown with the aid of irrigation. With sufficient water one can grow three crops, say, cabbages, potatoes, and a variety of green feed, therefore five acres irrigated would be equal to 15 where you could only grow one crop in a season. With the rent of good garden land at 10s. per acre, five acres would cost £2 10s., and 15 acres £7 10s., a saving of rent alone of £5. That would pay interest at the rate of about 5 per cent. on an engine costing £100 for pumping water. Then there is the reduced cost of cultivating five acres as against 15 acres, as land that is being continually cropped is easier to cultivate. With irrigation, it is very seldom that crops are a failure, and there are nearly two acres of crop growing now, including potatoes, cabbages, peas, and other vegetables, besides a nice crop of oranges on the young trees on the same land, which would have been useless for growing summer crops without water. This season the working expense of running the engine, including attendance, has been 6d. per hour. We tried an experiment, which I believe will be a great success. On the top end of what we call the swamp garden, we sank a large hole, which we are emptying by gravitation through nearly 600ft. of 2in. pipe with hose and sprinklers. Many of our vegetables would have been a total failure this season if water had not been available. Hillside land, that a few years ago was considered of very little value for potatoes and vegetables, is proving of more value than our flat swampy land; the reason for this is, I believe, that much of our hillside land has a good clay subsoil and retains the moisture and manure better, while our swampy lands have a spongy subsoil which carries a large amount of water in the winter and destroys the value of the manures, while the clay subsoil retains it. The above remarks apply to fodder plants. It would pay in this district on a great deal of our best land to keep cows for milk or butter. As you are aware, our land would be classed as third grade, that is, taking the unimproved value of it; yet, in addition to growing vegetables and fruit on not more than 50 acres, we have averaged 40lbs. of butter per week during the last two years. While we always feed the cows with bran and chaff at each milking the result is gained by feeding the cows on green stuff grown amongst the crops, such as milk thistles, hay, potato tops, and many other weeds and grasses that grow so well in summer. This paper would not be complete without some reference to the cost of wells, engine, pipes, hose, and sprinklers, which can be set down at £200, and the cost of renewals and repairs at £15. In our case they have paid for themselves with a good balance to spare, and are in good working order at present. In fact, we have taken this summer over £50 worth of produce. At the present rate of supply, every second day we can work four sprinklers eight hours; 100galls. of water spread with the sprinklers is worth 300galls. run on to the land. While running it on the land the roots of plants benefit, but the sprinklers benefit the leaves as well. In addition, the sprinklers throw the water in the air and bring the oxygen on the plant life. In the near future a fresh milk supply will be needed for the city of Adelaide, and there is no better place than these hills to supply that milk in the summer months. The Lower North can supply it in the winter months, and the hills district in the summer. There will be a municipal milk supply; that is, the Adelaide council will undertake the supply of pure milk, as is done in London and other large cities in England. The method they adopt is to first see that all dairies supplying the milk are perfectly clean, the milk is then sterilised on the farms, and bottled into pint and quart bottles according to the requirements of the customers. Milk trains are employed to carry the milk to the different cities as quickly as possible. The charges made for delivery are so arranged as to just cover working expenses. This is being done to ensure a pure milk supply. Mr. John Burns, President of the Board of Health in England, speaking of the decrease of consumption, said quite recently that at the present rate of

decrease it would be stamped out of England in 25 years. I quote this to show that the people of these hills will have a good means of disposing of their milk; this will open up a market and give an opportunity for our enterprising young men to get a start in life. The question of carriage will be overcome by a motor service to the city." In discussing the paper, Mr. Curnow said residents in the district had lost large sums of money in trying to discover a good supply of underground water; there were a number of surface streams with a limited supply of water, but deep sinking had not proved them to be powerful enough to be of any use for commercial irrigation. He did not think it profitable to put down an engine and pumping plant unless there was an abundance of useful water. Mr. Jacobs agreed with the Hon. Secretary. He said that Mr. Ricks could not prove that a good supply of water was obtainable by deep sinking on the south side of the Range Road. All attempts at deep sinking had been failures. Mr. H. Jacobs said that the cost of sinking wells at the present high cost of labor and with only an off chance of obtaining a supply of water, was prohibitive.

Hartley, February 3.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Tydeman (chair), Hudd, G. and T. Phillips, Pratt, Richardson, Clark, Hull, and Wundersitz.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—The proposal to introduce the system of selling cattle by live weight was discussed at length. It was thought that the change would not be resultant of good, and it was likely to prove expensive if scales were to be provided at all country sale yards.

Longwood, January 27.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. W. H. Hughes (chair), J. and W. Nicholls, J. Roebuck, G. W. Doley, E. H. Glyde, A. F. Furniss, H. Vogel, E. J. Oinn, E. J. Blakley, J. R. Coles (Hon. Sec.), and three visitors.

The meeting was held at the homestead of Mr. Glyde. The effects of the long spell of dry weather were very noticeable on all kinds of fruit. The season had been a bad one so far as young trees were concerned. Apples were expected to be small, but the yield would be heavy.

BEANS DESTROYED BY GRUB.—Mr. Roebuck reported that a row of beans, 80ft. long, had died off after reaching a height of 3ft. Upon investigation a grub, about 1in. long, was found to be attacking the roots and causing the trouble. Mr. Roebuck flooded the ground and this seemed to have destroyed the pest.

EXHIBITS.—Several varieties of fruits were tabled, including three kinds of nectarines, which seem to be doing well where planted on high and dry ground, and a variety of apple, known as White Transparent Pippin, which also seemed to grow well on the higher levels.

Lyndoch, February 14.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), G. K. Warren, H. Kennedy, H. Springbett, H. Klaube, E. Springbett, P. Burge, H. Lawes, J. S. Hammatt (Hon. Sec.), and three visitors.

FAREWELL TO AN ACTIVE MEMBER.—The meeting took the form of a valedictory social to Mr. F. K. Warren, who was leaving the district to reside in New South Wales. Several members spoke of the good work accomplished by Mr. Warren in pushing the interests of the Bureau, and regret was expressed that the Branch was to lose an enthusiastic and energetic member.

MacGillivray, February 6.

PRESENT.—Messrs. Wheaton (chair), Ayris, Matthews, Petras, Wiadrowski, Williams (Hon. Sec.), and one visitor.

EUCALYPTUS DISTILLATION.—The following paper was read by Mr. Wiadrowski:—
 “The species of mallee used for the production of eucalyptus oil on Kangaroo Island is what is commonly known as narrow-leaf and technically as *E. cneorifolia*. There is also another species of mallee known as peppermint used to a certain extent by some distillers, but although at certain times of the year it carries a higher percentage of oil than *E. cneorifolia*, the oil is not as rich in eucalyptol, and therefore not as valuable for medicinal purposes. There are other species of mallee and gum, broombush, &c., from which oil can be distilled, but not in payable quantities. In fact, for a medicinal oil, *cneorifolia* is the most payable known. There are two other species that produce oil equally as strong in eucalyptol, but the gathering of the leaves of these is too expensive, as they are a species of large gum and the cutters have to climb the tree to cut the leaf, and therefore very little of it is ever cut and distilled. In New South Wales, for distillation of oil they chiefly use the following species, *E. polybractea* (blue mallee), *E. amygdalina*, *E. dires*, *E. radiata*. In that State there is a fair quantity of oil distilled, but the stills are even on a more primitive style than the old pot stills in use here. In Victoria, where they are using stills of the more advanced type, the principal species used are *E. polybractea*, *E. leucosylon*, and *E. sideroxylon*. In some cases distillers mix these three, but in one factory they use only the latter and strip all the leaves off by hand. The Victorian Government grant leases for leaf-cutting, only charging a royalty of ½d. per pound of oil, and if the leaf yielded the same return per acre as our narrow-leaf the Government would be getting a rental of 2s. 6d. per acre. On Kangaroo Island during the last two years a great improvement has been made in the class of still used, from what is known as the pot still, of a capacity of 400galls. or about 1,000lbs. of leaf, to wooden digesters holding as much as 10,000lbs. of leaf. In some cases, the improvement was simply a still of larger holding capacity but on the same principle as the pot still. Thus the leaf and water were in the same vessel with the fire underneath, which boiled the water and forced the steam up through the leaf, thence passing on to the condenser. But for several reasons I consider a wooden digester to contain the leaf and the boiler for a steam generator a great improvement, as the oil distilled by this process comes out nice and clear in color, and not red as in the case with iron digesters through the action of the acetic acid in the oil upon the iron. Also it requires far less heat to generate the necessary amount of steam in a boiler than when the leaf is rammed down tightly in the same vessel as the water, and by using a boiler the distilled leaf can be more economically used as fuel. There are various opinions as to whether or not it is advisable to ram the leaf as tightly as possible in the leaf tank. Some distillers maintain that by having the leaf compressed too tightly the steam is prevented from getting all through it and thereby oil is lost. Some even used a sort of cage affair in the bottom of their tanks, which in their opinion allows the steam a better chance of getting all through the leaf. My own experience is that it is impossible to fill the tank so tight that you are unable to steam out all the oil. Of course with very short cut leaf one must allow a little more time for the distillation. On the matter of time to be allowed for the cooking out, or distilling the leaf, different distillers have different ideas, but the general thing is to allow three hours from the time the steam commences passing into the condenser. Of course, it all depends on the amount of steam generating. All the oil from a pot still of leaf can be distilled in one and a half or two hours. In fact, my experience is that it pays to keep the fire going and force the steam, thus getting more oil out of the leaf than with a slow fire and low pressure of steam. It will also be found an advantage when, perhaps, several days have elapsed without using the still and everything is cold, to put the required quantity of water in the tank and get the fire going and the water boiling before putting in the leaf, for once the leaf is in the tank the quicker the oil is steamed out of it and distilled the better will be the result. It is almost impossible to get too great a pressure of steam, providing it cannot escape anywhere excepting into the condenser, and this must be kept cool and be long enough to thoroughly condense all the steam passing through it. There are many ways of fixing the lids of pot-stills. I have tried several and have proved the ‘pugging up’ style the most effective, as it prevents any escape of steam, and is also the quickest. One great folly that most, or many, oil distillers are guilty of, is making oil all the year round. There are various reasons for this, but the fact remains that it is the height of foolishness, and can be compared to a farmer having a standing crop that gives promise of returning 30cwt. of hay per acre, who cuts it all when it is about half-grown. The cost of cutting, distilling, &c., is exactly the same in the winter months as in the summer, and leaf that would return 10lbs. of oil per pot still in the winter could be safely reckoned on returning 18lbs. if cut at the right season, which

means that the 10lbs. of oil costs as much to produce as the 18lbs., and reckoning oil at 9d. per pound a man is losing on an average 6s. per still, or if he is doing 12 stills a week, is losing £3 12s. a week. One reason why this loss is incurred by many who cut their leaf when it is giving such a low return is that the leaf is growing on our land and costs us nothing to establish, and therefore we do not put the value on it that we should. The leaf does not always return the highest percentage of oil at the same time every year. It varies according as the summer sets in. If it sets in hot early the leaf is fairly good in November, but some years it does not improve much until well into December, and with the exception of the leaf which has grown very quickly on cultivated land, or leaf when at its best returns 3 per cent. of oil, it will not diminish much in its yield of oil until the latter end of March. But as the oil varies so does the leaf vary as to the time when it will give its best return. What I mean is, that all the leaf is not at its best at the same time. One may cut leaf growing in one place in December and obtain 20lbs. of oil per still, and if cut in February the same leaf would only return 14lbs. per still, and again from different soils the returns would be reversed. Therefore it is necessary for a distiller to know all his leaf and see that his cutters are cutting where the leaf is ready, leaving alone that which has not yet reached the proper stage. Oil that is got from leaf yielding up to 3 per cent. will not be as strong in eucalyptol as that only yielding $1\frac{1}{2}$ per cent., although the class of oil has also a lot to do with this. Leaf growing on good land may be returning 20lbs. of oil per pot-still, and yet the oil would be as strong as that from leaf only giving 12lbs. per still, but growing on poor soil. The question has often arisen in my mind whether it would pay to cultivate *E. cneorifolia*, and after giving the matter a lot of consideration, I say most emphatically, yes; and I am astounded to know that yearly hundreds of acres of narrow-leaf on Kangaroo Island are being exterminated, the land being cleared at great expense for growing cereals and grass. In some parts of the world land is being planted with different species of eucalypts for oil production, and later on the same thing will be done here. Yet at present we have the leaf growing here in its natural state and so far from putting value on it are trying to exterminate it as quickly as possible. Narrow-leaf has, without any attention or cultivation, given a net return of £3 per acre, and if this land was cultivated so as to improve the growth of the leaf, this return from oil could be maintained yearly, and a 12bush. crop of corn could also be taken off the same land every third year. If the world's markets for eucalyptus oil are opened up as they should be, the demand will largely increase and better prices will result, and the net profits per acre will be larger than from a 20bush. crop of wheat per acre, at 3s. 6d. per bushel, especially in these parts where we have long distances and bad roads over which to cart our grain. There is a certain amount of carting in connection with oil distilling, namely, the carting of the leaf, but as a rule this does not have to be carted more than one mile and the oil has to be carted the same distance as the grain. A ton of wheat at 3s. 6d. per bushel is not even worth £7, whereas a ton of crude oil as low as 9d. per pound is worth £84. In making the assertion as to the folly of exterminating narrow-leaf, I do not mean to say that it should be simply cut for oil, and then left with the other scrub growing amongst it. No; my idea is to roll the scrub, narrow-leaf and all, and crop it. For the first ploughing the plough can be set fairly tight, and then it will pull out the broom bush, ti-tree, and such shrubs that usually grow among the leaf. If even a few narrow-leaf stumps are broken up it will not matter much, but subsequent ploughings should be done with the plough set very light. Better still, only use a cultivator, and crop the land every three years, when a very fair crop of corn can be grown, and every year a good crop of leaf can be cut. With this treatment the leaf will yield more oil, even if the soil is also carrying a crop of corn, than it would if left with the other scrub growing amongst it. After the first burning off and after the roller, keep the fire stick out of the leaf-country. In many cases red mallee grows amongst the narrow-leaf, and few of these stumps will pull out with one ploughing. But two fires will kill most of these, and if after the leaf is cut the first year after rolling, these red mallee shoots are cut and burnt on the stump on a cool day, when there is no fear of the fire running, there will be no further trouble from them. If this practice is followed, even at the low price of 9d. per pound for crude oil, the land can easily be made to return a net profit of £2 per acre for oil, as well as a 12bush. crop of corn every third year, and can be used for grazing in the meantime. My calculations for this are based on only average returns of oil from leaf treated, namely, 25lbs. per 1,000lbs. of leaf, which I have obtained from poor ironstone land and with only a low price for oil; reckoning also three pot-stills per acre. This means there is plenty of open ground left for grass to grow on, as you can judge for yourself, knowing the still of green leaf weighs about 9cwt., which is only reckoning 27cwt. per acre, whereas an acre of narrow-leaf growing as densely as a crop of wheat returning two tons of hay per acre, would return about 10 or 11 stills per acre. A sudden demand has lately arisen

for eucalyptus oil, owing to its use in the mineral industry, in the separation of metallic sulphides. But not a great deal of our oil has so far been used for this purpose, as the cheaper phellandrene oils of Victoria and New South Wales are just or nearly as suitable, and being cheaper, are used in preference to ours. Various resin oils have also been used with fair success, and are cheaper even than the phellandrene oil; but although suitable for the treatment of zinc ores, they are not suitable for copper ore, and as there is only a limited supply of raw material, this oil will not affect us as a competitor. Without doubt there is going to be a far larger demand for eucalyptus oil in the near future for mineral purposes, as the flotation process is only a recent invention. Moreover, for medicinal purposes, if the world's markets are opened up as they should be and the oil is placed on the market in a pure, unadulterated state, all the narrow-leaf now growing on Kangaroo Island would not produce enough oil to supply the demand, and as ours is absolutely the best for medicinal and veterinary purposes we need not fear the competition of the other States. However, it behoves every one of us who has narrow-leaf country to protect it, even if at present we do not make use of it for oil. It will cost us nothing to establish, and once killed the leaf will take years and a lot of capital to re-establish, and I am sure there are none of us but have plenty of land to clear without exterminating the narrow-leaf." The opinion was expressed by some members that the extraction figures quoted by Mr. Wiadrowski were too high.

Morphett Vale, February 20.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. H. O'Sullivan (chair), A. Anderson, A. C. Pocock, L. R. Christie, A. Connole, W. Goldsmith, T. Higgins, and E. E. Hunt (Hon. Sec.).

EXHIBITS.—Mr. Anderson tabled a fine sample of prime Bismark apples. The tree from which the fruit was taken had been eaten down when young, and had been grown without irrigation. He also tabled a sample of Brandis almonds, well grown and of uniform size.

BY-PRODUCTS FOR FATTENING STOCK.—Mr. H. C. Pocock read a paper in which he pointed out that it was necessary for the farmer to grow all the feed he required for his stock. Farmers who were purchasing large quantities of bran and pollard from merchants were only forcing up the prices of these by-products to a point which made their purchase unprofitable. Continuing, he said—"Farmers should grow oats, barley, and peas, and keep plenty for their own use. It is better to have some to sell at the end of the season than to have to buy. They will find stock will do very well, and will be much cheaper to feed on oats mixed with a little barley or wheat. Mix this with good chaffed hay and one has the best of feed both for horses and cows. If one adds to this mangold wurzel and any greenfeed one is able to grow, there should be plenty of feed to carry the stock through the year." Members thought that in some cases it would not pay to grow green fodder, as the cost of irrigation would be too great. Under these circumstances it would be better to buy bran and pollard. If the market for these by-products was destroyed by the farmers using corn instead of bran and pollard the price of wheat would be affected, because the by-products helped to keep up the price of the wheat.

Mount Pleasant, February 10.

(Average annual rainfall, 27 in.)

PRESENT.—Messrs. G. A. Vigers (chair), T. C. Phillis, V. Tapscott, P. and J. S. Miller, F. Langford, J. Maitland, and D. C. Maxwell (Hon. Sec.).

QUESTION FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—The proposal to introduce the system of weighing wheat in bulk was duly considered. Members thought the weights could not be so accurately ascertained on large weighbridges as they could on the scales now in use. It was decided not to support the change.

CROPS AND STOCK.—Crops generally throughout the district during the present year were reported to have been very light and not up to expectations. The average yield was estimated to be about 5 bush. to the acre. Considering the scarcity of feed stock were doing fairly well.

MARKETING PRODUCE AND STOCK.—This subject was dealt with in the following paper by Mr. G. A. Vigers:—"Next to being able to produce stands the question of being able to successfully market the produce. The producer needs to follow the markets very carefully indeed if he wishes to obtain the best results from his labors. I estimate that fully 20 per cent. of the return of a well-managed farm is obtained by successful marketing. The civil servant, the artisan, and the laborer know what their returns will be for a given amount of labor, but the producer does not know what his returns will be until he makes up his balance-sheet at the end of the year. The merchant and storekeeper also know what percentage to expect from their turnover; but the producer is entirely dependent upon the fluctuation of the market for his returns. The laborer obtains his wages, the business man deals in a quick turnover, but the producer has to plan for years ahead; he sows his crop, but he has not the faintest idea what the yield will be or what the price will be; he breeds his stock for a market several years off without any idea what the seasons or the markets will be; and the only way he can come to any conclusion as to what his returns will be is by the law of averages, that is, by looking back over the past 10 years, which will give him some idea as to what to expect during the next 10. But even with that experience there are so many factors in the market that it is absolutely impossible to deal on certain lines. There may be a glut when one expects a firm market; there may be a long dry spell which will force one to sell when, under other conditions, one would not. Be a man ever so smart he cannot always depend upon catching the top markets for the year. A producer should be guided to a certain extent by the law of averages, that is, he has to arrange his stock to have them ready for market at that time of the year when by past experience he knows he has got the best returns. I would not advise anyone to place any line of produce (with the exception of wool) upon the market at one time during the year, but make it up in several lots and place a portion of it upon the market when there is a strong demand. This especially applies to sheep. I have made a practice for some years of putting a consignment upon the market at intervals subject to market fluctuations, during the year, always endeavoring to hold my stock until there is a firm market. With dairy cows I have found it the best plan to always endeavor to sell them as springers, and I try to have them springing some time during the autumn or winter months, when there is usually a good demand for well-conditioned springers for the city milk trade. It is very poor policy to try to sell stock unless it is in good condition. There is always a market for stock in good condition; but with years like the present one there is practically no market for poor stores, and it is much safer to understock during years of plenty than to be overstocked when a lean year comes. In marketing my wool I have always placed it upon the local market, and taken the ruling market price, but at the same time I think it is wise to place a reserve upon it as a protection. A grower is in just as good a position as a broker to judge the future in wools. With the daily paper, cable messages, &c., he is in close touch with the world's markets, and can form a pretty fair idea as to what the market is going to be; but at the same time I would not advise placing more than a fair market value as a reserve, unless you have some intention to ship. Buyers do not like a line appearing too often upon the catalogue. In marketing dairy produce I have, of late years, put the milk through the separator and taken the cream to the factory to be made into butter. By taking the cream to the factory one saves a lot of haulage compared with carting milk; and the milk from the separator is more suitable for feeding calves than the mixed milk that is obtained from the factory, especially when the separating is done after each milking at home. A good deal of labor is also saved by letting the factory have the cream; and the factory can always obtain a far better price on the market for butter than the producer: in fact, generally, he can obtain more than the difference of the cost of making the butter up. A factory can make the cream into butter for 1d. per pound for the butter, and generally the market for factory butter is from 2d. to 4d. per pound above dairy butter. In marketing pigs, I find it preferable to place them on the market alive, rather than go to the trouble of making them into bacon. The bacon-curer, as with the butter factory, can obtain a much better price for his bacon than the producer: but in putting pigs on the market one needs to be very careful indeed, for I think the pig market is about the most tricky of any market for stock: it is so subject to fluctuations. Once a pig is fat, however, it does not pay to hold it, unless the market is very bad, as it costs a good deal to keep a pig fat for any length of time. The best time of the year to market pigs is during the winter months, as there is less risk in curing than at other times during the year; but I know one has to be guided by the food supplies as to when he shall sell. The producer should bear in mind the following points:—(1) Do not overstock. (2) Always be prepared to hold until the market fluctuates upward, and sell if you are getting a fair price. (3) Never worry about getting the very top prices; let the buyer make a

little out of it. With dairy produce, sell it week by week and accept current rates. Whatever you have endeavor to keep it as near the best of its kind as you can, for if there is any market at all the best sells best." Members generally agreed with the views expressed by the writer of the paper.

Port Elliot, January 20.

(Average annual rainfall, 20½ in.)

PRESENT.—Messrs. H. B. Welch, J. Brown, J. Chibnall, H. Green, J. Barton, and W. W. Hargreaves (Hon. Sec.).

BUSH FIRES.—Members suggested that where possible a few plough furrows should be put round the grass paddocks; and in scrub lands a chain width of scrub should be rolled and burned each year early in the season as a check against bush fires. The district council should have power to appoint special constables with the idea of bringing to book persons who contravened the provisions of the Bush Fires Act. As so much grass had been burnt, the present was a most opportune time to deal with rabbits.

JUDGING AT SHOWS.—The following paper was read by Mr. J. Chibnall:—"It appears to me that more interest would be taken in our agricultural shows if a system were adopted which permitted the judges in each class to take with them a student. We should then have a class of men being trained to make competent judges, and most probably enthusiastic exhibitors as well. Under the present system it is often the persons who push themselves forward most who become judges, and in some cases these are the least competent. If the system suggested above was adopted we should have in time a higher standard of exhibits and more competition. I feel sure that any competent judge would take pleasure in pointing out the good and bad points of the exhibits that he was asked to judge and, no doubt, it would increase the judge's interest in the exhibits, so that he would discover points that would interest the student that accompanied him."

SOUTH-EAST DISTRICT.

Kalangadoo, January 13.

PRESENT.—Messrs. G. Riddoch (chair), Earle, Tucker, Kennedy, Gibb, Bennett, McCorquindale, Sudholz (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—It was generally agreed that little benefit would result from the introduction of the system of selling cattle by live weight.

Farm Laborers' Blocks.—The proposal to survey small blocks in new hundreds for the purpose of providing holdings for farm laborers was duly considered. Members thought the idea was not workable in so far as this district was concerned.

Lucindale, February 17.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. Rayson (chair), Johnson, Carmichael, McMorron, Secker, Copping, McInnes, and Secker (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—After due consideration members decided not to support the proposal to institute the system of selling cattle by live weight.

Farm Laborers' Blocks.—The suggestion that the Government should survey small blocks in new hundreds to provide holdings for farm laborers met with the approval of members.

Millicent, February 13.

(Average annual rainfall, 28½ in.)

PRESENT.—Messrs. G. Mutton (chair), H. F. L. Holzgrefe, J. J. Mullins, J. Bowering, T. Edgcombe, H. Oberlander, and H. Day (Hon. Sec.).

VEGETABLES.—Mr. Oberlander tabled some very large table turnips of the "Snowball" and "Favorite" varieties, grown on his property, also a prime sample of potatoes—being "Redskins" and "Adam's Prolific." The last-named, he stated, was a better variety than the former. His crop, which was grown on light land, returned 60 bags per acre. He had used 4cwts. of potato manure per acre. Where "cut" seed had been planted a number of "misses" had been noticed. A short discussion took place on growing vegetables from home-grown seed. Mr. Bowering stated that he had not been successful with his own seed, especially with parsnips. The Chairman said the ground required trenching for this vegetable. He had been growing his own seed for a number of years, and had found it reliable. It was necessary, of course, to select only large and well-matured plants for seed. He always checked his pumpkin plants, to prevent them from running too much.

ROOT CROPS.—Mr. Mutton initiated a discussion on growing root crops. He was surprised that sheepfarmers did not more extensively cultivate swede turnips and mangolds. Mr. Holzgrefe remarked that such crops were so subject to blight that it made them rather uncertain. He regarded maize as one of the best summer fodders. Mr. Bowering entertained the idea that maize was a great robber of the soil, but he had grown a fair crop of it this year on a piece of very poor land.

Naracoorte, January 13.

(Average annual rainfall, 22 in.)

PRESENT.—Messrs. L. Wright (chair), E. Coe, W. Loller, A. Caldwell, and H. S. Schinckel (Hon. Sec.).

MANURAL EXPERIMENTS ON GRASS PLOTS.—Mr. Schinckel, who during the past three years had been conducting experiments with the idea of ascertaining the effects of dressings of manures on grass lands, read a report as follows:—"The plots were first treated on May 18th, 1909, when the manures were just drilled on top of the grass land and then harrowed once. That was all the cultivation they received. They were fenced off, and no stock was allowed on them until the growing period was over, when they were fed off by sheep and cattle. In 1910 all stock was again kept off from about July 1st until the growing period was over, and then the plots were again fed off, and last year (1911) they were similarly treated. They will now be fed off again and reserved during the growing period for this year. It will be noticed that plot No. 2, which was treated with practically a complete manure, gave the best results for the first two seasons; but for the third season it is not as good as plot No. 7, which has been treated with super. only. I have had the same experience with cereal crops treated in a similar way, and I am unable to explain why this should be so. It will be noticed that plot No. 3, treated with mineral super. and nitrate of soda, in no year gave results as good as plot No. 4, which was treated with mineral super. and sulphate of potash. The same may be said of plots 5 and 6—that is, that sulphate of potash gave better results than nitrate of soda for each year. After carefully watching these plots for three seasons I can come to no other conclusion than that it is not profitable to apply nitrate of soda or sulphate of potash to our low-lying pasture lands; but it must not be overlooked that they were applied to the soil during the month of May, 1909, and that year and the following one were exceptionally wet. Therefore, had the nitrate of soda and sulphate of potash been applied, say, during the month of September, the leaching probably would not have been so fast, and the results may have been more favorable; or had the first years been dry ones the results might have been different. Though the growth of grasses, particularly of the clover family, on plot No. 7 is not so very much better than on plots 2, 3, and 4, I have no hesitation in saying that I consider it is remunerative to give our low-lying pasture lands a liberal dressing of phosphates, and I also feel satisfied that the phosphates are not taken out of the soil owing to one or two wet seasons." The following table accompanied the report showing the order of merit of each plot during each year:—1909, 1910, and 1911.—
No. 1—No manure—7, 7, 7; No. 2—2cwts. min. sup., 1cwt. nitrate of soda, 1cwt. sulphate of potash—1, 1, 2; No. 3—2cwts. min. sup., 1cwt. nitrate of soda—3, 4, 4; No. 4—2cwts. min. sup., 1cwt. sulphate of potash—2, 2, 3; No. 5—1cwt. nitrate of soda—6, 6, 6; No. 6—1cwt. sulphate of potash—5, 5, 5; No. 7—2cwts. min. sup.—4, 3, 1.

Wirrega, February 3.

PRESENT.—Messrs. Exton (chair), M. and J. J. Green, F. and L. Densley, Tillbrook, Laurenti, Prime, Fairweather, Rogers, Cook (Hon. Sec.), and two visitors.

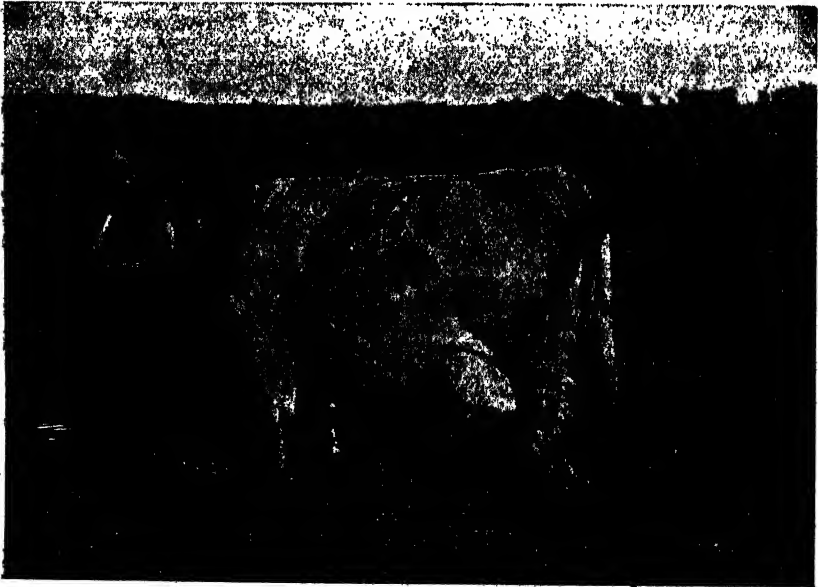
QUESTIONS FROM CONGRESS FOR OPINION.

Weighing Wheat in Bulk.—Members generally expressed dissatisfaction with the present method of weighing wheat, and favored the proposal to introduce the system of weighing in bulk.

Farm Laborers' Blocks.—The idea of surveying small blocks in new hundreds to provide holdings for farm laborers, commended itself to members as likely to be productive of good results. It was thought that the blocks should vary in area according to locality, and should be large enough to enable the holder to keep a cow and a few fowls.

PHOSPHATIC MANURES.—Mr. W. R. Fairweather read the following paper:—"On the introduction of phosphatic manures, especially superphosphate, a turning point was reached in South Australian agriculture. In the case of wheat production payable crops could only be grown on land of high fertility, but since phosphatic manures have been used, lands previously regarded as useless are producing handsome wheat crops. Mallee land is no longer looked on as so much waste desert. Let us, if we can, consider the cause of this. For any plant life to grow, there are certain plant foods in the soil which must be available to the plant, whether wheat or any other, and in the case of South Australian soils, the most noticeable deficiencies are phosphoric acid and lime, the two main constituents of phosphatic manures. The supplying of these two plant foods resulted in a fertility that in the case of some lands was marvellous, besides bringing back to their original fertility played out country, which had been cropped for a number of successive years. There are various forms of phosphatic manures, chief among them being superphosphate, bonedust, and Thomas phosphate, all of which have different degrees of solubility. The form of phosphatic manure as supplied by superphosphate is the most soluble in water; therefore its benefit is sooner felt than in the case of, say, bonedust. In a quick-growing plant, such as wheat, this is essential, and this is the reason why super. is used universally in South Australia to-day. Where a lasting effect is required, bonedust is a more suitable form of phosphatic manure, owing to its slow solubility. This is especially suitable in the case of fruit trees. As it is in super. that most of us are interested, I will confine myself to that. Owing to competition, most of the varieties of super. now on the market are reliable, but in my opinion any under 36 per cent. water-soluble phosphate should be rejected, as others at the same price can be obtained with a higher test. The super. in all cases should be dry, free from lumps, and fine to make it run freely through the drill. The rate of application varies according to the crop, the nature of the land, and in our case (that of mallee land) according to the success or failure of the burn, but in each case the farmer must use his own judgment and discretion. On the lighter classes of land one should be very careful and think twice before any application of over 100lbs. to the acre is made. The danger lies in the fact that should an exceptionally dry spring appear the wheat is liable to "burn," that is, go right off. In ordinary years in the Tatiara district this danger is not so great, as the spring is often too wet. The rate of applying super. should also depend on whether the land is to be used the following year for wheat or whether it is to be left to grass. When stock is carried heavy applications of super., though not materially increasing the wheat crop, have the effect of increasing the growth of grass of the following year, which will often more than pay for the extra cost of the manure. I have seen two paddocks cropped, one with 80lbs. of super., the adjoining one with 2cwt. At harvest time no benefit was noticeable from the heavier application, but the year following this paddock yielded twice the grass, and consequently carried far more stock. In the Pinnaroo district where a good burn is obtained very few farmers apply more than 50lbs. to the acre, the majority only putting on 30lbs. This is too low for our district, owing to the heavier rainfall here, which results in a certain proportion "leaching," i.e., washing down in the soil, and becoming lost to the wheat crop. In applying super. so many things appear to make the quantity vary that the farmer has to use his own judgment, and find out by experience what rate is best suited to his own particular case. A change which is apt to take place in super. after its manufacture is what is known as the reversion of the soluble phosphate. Thus it is found that on keeping super. for a long time the percentage of soluble phosphate becomes less than it was at first. The rate at which this deterioration goes on varies in different samples. In a well-made manure it is hardly noticeable, but in the case of some made from unsuitable materials it may amount to a large percentage, so that it is seen that it is unwise to store super. if it can be avoided. Thomas phosphate or basic slag and bonedust, are of minor importance in wheat production generally, but Thomas phosphate would be very suitable to

our lands, which on the whole here are very deficient in lime. Thomas phosphate, besides comparing well with super. as regards soluble phosphate, is far richer in free lime. From this it will be seen that this form of phosphoric manure would be worth experimenting with on our lands that are evidently deficient in lime. Thomas phosphate in a general way is most beneficial on heavy peaty lands, which, being rich in organic matter are deficient in lime." A good discussion ensued, especially on the leaching of super., members generally being of the opinion that, no matter how light the ground, superphosphate would not leach. Members felt that whether a dressing of 75lbs. or 150lbs. was applied very little difference showed in the crop following.



"Blue Ribbon of Turretfield."

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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Preparing Land for Settlement.

For the purpose of assisting settlers to successfully occupy agricultural land as yet unalienated the Commissioner of Crown Lands (Hon. F. W. Young) proposes, where possible, to make arrangements for a supply of water being provided and for having roads defined and made passable before it is offered for settlement. With this end in view he recently called for a report from the Surveyor-General as to the ordinary Crown lands now in course of survey. The report states :—" On Eyre's Peninsula about 150,000 acres have been surveyed, and the survey of 75,000 acres more will be completed in about two months' time. On the Tailem Bend to Brown's Well railway line five surveyors are now engaged in surveying three hundreds, containing about 220,000 acres, the survey of which should be finished in about five months. It is intended to have three survey parties in the hundreds near the terminus of the Minippa Hill railway line. These three hundreds will embrace an area of about 180,000 acres, and another surveyor will be dispatched to the locality as soon as available. The hundred of Darke, comprising 68,000 acres, is now in course of survey, and this should be completed in about four months' time. When this hundred is finished it is intended to survey the hundred of Solomon. In addition to the lands surveyed and on which the surveyors are now engaged, there are about 750,000 acres in the localities which should be made available for offer during the next 16 months."

Is Federation Wheat Degenerating?

Under the above heading Mr. J. T. Pridham, Assistant Wheat Experimentalist in New South Wales, writes interestingly in last month's *Agricultural Gazette of New South Wales*. Mr. Pridham sets out variations in the length of the straw and appearance of the heads of the plants of Federation which have come under his personal observation and had been noticed by the managers of some of the experimental farms. Grain from the plants showing the variations was sown, and, as regards those observed by Mr. Pridham, the "sports" persisted in each case. The article concludes :—" Besides the appearance of the heads and height of straw, a slight difference in the width and depth of color of the leaves has been observed, and in the size and shape of the grain. The variations in the grain, however, that have come under notice have in no case been sufficiently marked as to cause sus-

picion as to the purity of the wheat. The unstable condition of this variety in recent years has afforded a good opportunity for selection in respect of grain quality. According to Mr. Guthrie's milling analyses the flour strength and quality of Federation are better now than they ever were, though it is true that deterioration in this respect begins so soon as the variety leaves the hands of the wheat-breeder unless proper methods of seed-selection are followed. It has been said that Federation is 'going to pieces'; but in our stud plots at Cowra this season it has out-yielded all other standard varieties, and the grain is of excellent quality, and should yield a flour strength of 50. It cannot be denied that Federation is decidedly rust-labile, takes mildew and flag-smut more than most wheats, and is quite susceptible to bunt; but these shortcomings are outweighed by its heavy yielding qualities. The variations seen from time to time appear to be of little consequence from the wheatgrower's point of view, and, except to the practised eye, would escape notice in the farm crop."

Crossbred and Merino Wool.

According to figures published in *Dalgety's Review* for July, 1911, Australasia's share in the output of crossbred wools is only about one-eighth of the world's total production. Of this small fraction Victoria and New Zealand supply the greater proportion. The total export of wool from New Zealand during the year 1910-11 was 493,372 bales, of which, on the basis of local sales, 97 per cent. was crossbred, and the balance, 3 per cent., Merino. For the same period, 44 per cent. of the production of Victoria was crossbred, South Australia produced 10 per cent., New South Wales 6 per cent., and Queensland 1 per cent.

Cow Houses.

There is one type of cow house which is very common in many districts of Britain, but which is objectionable in several ways (says a leaflet issued by the Board of Agriculture). In it all the stock are fed from one central passage, while the manure and the milk are removed by the two at the sides. In this case the cows' heads are a long way from the fresh air inlets, and the animals breathe into each other's faces from opposite sides of the passage. In a building of this class, unless it is exceptionally well ventilated, the general health of the stock is likely to be low, and one infected animal may cause great damage. Such a cow house is also defective, in that the passages from which the milking is carried on are usually too narrow to secure milk standing in larger ones from 6½ft. to 7½ft. Each cow stall should be proportionate in

length to the class of animal that is expected to occupy it. For small cows, such as Jerseys, Kerries, and young Ayrshires, the stall (measured from the manure channel to the wall or division between the cows and the passage) should be from 6ft. 9in. to 7ft. long, inclusive of the breadth of the trough. For Ayrshires, a stall of 7ft. to 7ft. 3in. is quite sufficient, while Shorthorns require from 7ft. 3in. to 7ft. 6in., and exceptionally large cows 3in. more. For the smaller cows, each double stall should be from 6ft. to 6½ft. wide, and for the larger ones from 6½ft. to 7½ft.

Identification of Plants.

During the past few months a large number of plant specimens have been received by the Department of Agriculture for identification from various parts of the State. This is a gratifying indication that agriculturists are taking a keener interest in the subject than heretofore, and are more alive to the necessity of encouraging fodder plants and discouraging noxious weeds. We would be pleased, however, if secretaries of bureau branches and others forwarding botanical material would give fuller particulars than most of them do. They should state whether the plant is cultivated or has appeared adventitiously among seed which they have sown, and if so, where the seed came from; also whether the plant is growing wild, and if so, to what extent; whether it is apparently native or foreign, or a garden escape; and whether stock eat it or avoid it. These particulars would not only assist in the task of identification, but would help to form a useful record about each plant. It is necessary to repeat that each specimen should show flowers or fruit, or both if possible, for only a few days ago a portion of one leaf was received from a correspondent, with request for the determination of the species.

New Zealand Cow-Testing Association.

In the 1911 annual report of the New Zealand Department of Agriculture, the Hon. T. Mackenzie, F.R.G.S., Minister in Charge, writes:—"One of the most important movements for the advancement of milk-producing interests yet undertaken by my department was the formation of cow-testing associations, the importance and possibilities of which I at once realised when I assumed control of the department. Although the associations are as yet limited, so enthusiastic has been the support of the farmer that the movement bids fair to rapidly extend throughout the dairying districts of the Dominion, and to exert a far-reaching influence on the welfare of the industry. Realising all that this movement means to the settlers and to New Zealand, I intend to do all in my power to encourage its development."

Market for Barley.

According to statements in the American press, a good demand for barley is likely to exist for some time to come, both in England and America. The American brewers use yearly 1,500,000 tons, about 60,000,000bush., and the English brewers import yearly 1,000,000 tons, or about 40,000,000bush. California's 1911 barley crop totalled 500,000 tons, approximately 20,000,000 bushels; 14,000,000bush. are required for home consumption, leaving 6,000,000bush. available for export.

Californian Walnut and Olive Crop.

The 1911 walnut crop of California was estimated to total 12,500 tons, or nearly 3,000 tons greater than in 1910. The production of olive oil in the State last year is given as 600,000galls., and the pickled olives it is estimated amounted to more than 1,000,000galls.

Bees in the United States.

The census of 1910 shows a decrease of almost 800,000 colonies of bees on the farms of the United States. There is also a considerable decrease in the number of farms reporting bees. No returns are available for bee-keeping in the towns and cities. The United States Department of Agriculture attributes most of the decrease to the brood diseases of bees which are now found widely distributed in the United States.

Chemical Composition of Wheat.

In a bulletin issued by the University of California the results are given of experiments relating to the effect of soil and climatic conditions on the composition of wheat. In a series of preliminary trials the following conclusions were arrived at:—(1) Wheats of the same variety, when grown in the same locality and under the same conditions, vary but little in composition, even though the seed differs widely in physical and chemical characteristics. (2) Wheat of the same variety, and absolutely uniform in other respects, if sown in different localities with different climatic conditions, yields crops of widely different appearance and chemical composition. (3) Soil and seed (this apparently does not refer to variety but to general character) appear to play a very small part in influencing the composition of wheat. These all suggest that climate is the principal factor affecting the nitrogen content of wheat. In order to test further the effect of soil on the nitrogen

content of wheat, soils of widely different types were obtained, and small plots made with them at the experiment station, thus eliminating the influence of climate. The experiment has been carried on for three years, and two varieties, one a "high protein" wheat, the other a "low protein" one, have been tried. From the results it seems quite certain that the soil nitrogen has very little, if any, direct influence upon the nitrogen content of grain grown upon such soil, and that some climatic factor is sufficient to overshadow the soil factor entirely. Further, it appears that the nitrogen content of an original seed, when grown elsewhere than in a climate to which it has been acclimatised, has little or no influence upon its progeny. In an addendum dealing with the 1911 crops the conclusion is again emphasized that "the climatic factor is the chief one in producing changes in the chemical composition of wheat."—*British Journal of Agriculture*.

New Zealand Butter and Cheese Export.

During the 1911 season New Zealand exported 350,172cwts. of butter, valued at £1,873,420, an increase of 10,945cwts. in quantity, and a decrease of £111,057 in value compared with the previous year. The export of cheese amounted to 445,062cwts., valued at £1,279,552.

Imports and Exports of Plants.

During the month of March 3,137bush. of fresh fruits, 4,035 bags of potatoes, 1,356 bags of onions, and 64pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 92bush. of bananas (chiefly over-ripe) were rejected. Under the Federal Commerce Act 71,498 cases of fresh fruits, 197pkgs. of preserved fruit, and 1,987pkgs. of dried fruit, and 250pkgs. of honey were exported to oversea markets during the same period. These were distributed as follows:—For New Zealand, 1,080pkgs. dried fruit, 644 cases grapes, and 110pkgs. of preserved fruit; for India and East, 87pkgs. preserved fruit, 119 cases grapes, 1,902 cases apples; for London, 889pkgs. dried fruit, 1pkg. honey, 45,561 cases apples, 1,401 cases pears, and 25 cases grapes; for Germany, 18 cases dried fruit, 249pkgs. honey, 20,809 cases apples, and 787 cases pears; for Stockholm, 250 cases apples. Under the Federal Quarantine Act 1,416pkgs. plants, seeds, bulbs, &c., were admitted from oversea sources.

AGRICULTURE IN OTHER LANDS.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College.

(Continued from page 37.)

TUNISIA.

On the 10th November, 1910, I left Marseilles for Tunis, by the *St. Augustin*, of the Compagnie Transatlantique. The Blue Mediterranean is little more than a narrow land-locked lake; and yet when the Mistral blows down the Rhone Valley it can make things particularly unpleasant for the rather small vessels that run between the European and African coasts. Our mail-boat was none of the newest or of the best equipped—indeed I recollect covering the same distance with her some 20 years ago—and the troubled waves gave us no respite until we came within shelter of the beautiful gulf of Tunis. I had always looked forward to seeing the old well-remembered landmarks slowly breaking into view; but alas, this was not to be, for it was under the veil of night that we approached the African coast; and beyond the intermittent flashes of passing lighthouses, and later on the twinkling lights of the Carthaginian shore, all was hidden in darkness.

The town of Tunis is not a natural seaport; it is situated on the edge of a salt lagoon in communication with the sea, and enlivened at times by the scattered ranks of rosy-winged flamingoes. In 1892, and earlier, vessels of any tonnage were compelled to stand out to anchor in the gulf at some distance from the coast; very much as was formerly the case with ocean-going liners at Largs Bay. In those times one landed at Goletta, erstwhile the Port Adelaide or Pyraeus of Tunis, and thence proceeded to the capital by way of a railway line skirting the shores of the lake. All this, however, has been changed now; between the sea and the city of Tunis, the French have dug out a fairway through the lagoon; and, to-day for all purposes of vessels that visit it, Tunis is a seaport and Goletta a living ruin.

We set foot on the wharfs of Tunis in the early morning of the 12th, exactly 18½ years since the time I left Africa for Australia; and great, in the meantime, had been the changes that had swept over this white eastern city. The European quarter of the town has changed almost beyond recognition; it has extended its boundaries, and encroached considerably on what was formerly country land; streets have been widened or diverted; an electric

tramway service has superseded the old horse cars, and the heart of the city is now connected with its numerous country and suburban residences; avenues of trees have been planted or grown beyond my recollections; in brief, I found myself at first quite at sea in a city with which I was at one time thoroughly familiar. Alone, the Arab quarter, emblematic of the East in its contemptuous defiance of the bustling energy of Western civilisation, stands immovably the same. One notable innovation, however, could not escape my notice here; native shopkeepers have seen the advantage of acquiring the language of their conquerors, and to-day an European can make himself more readily understood in the bazaars of Tunis than in those of Cairo.

I had originally intended visiting Tunis in April or May, the late spring of the year in this part of the world, when the standing crops would have shown to best advantage; circumstances, unfortunately, compelled me to change my plans; and I now found myself in Tunis at the dead time of the year, with not a vestige of verdure to be seen anywhere. Weather conditions at the time were distinctly droughty, and seeding operations were impeded accordingly. I was not able to spend more than a fortnight in Tunisia, and although portion of this time was given to the country, for the bulk of the information collected I am indebted mainly to the Office of the Director of Agriculture, and particularly to M. R. Schilling, an old fellow student of mine.

TUNISIAN CLIMATE.

I have always thought that the North African coast, and particularly Tunisia and Algeria, presented far more points in common with the climate of South Australia than is the case with Southern Europe. And hence I take it that so long as economic conditions place no difficulties in the way, any form of agricultural practice found to be successful in one country should prove almost equally so in the other. The fact, however, that the Regency of Tunis has for extreme southerly limit the great barren Sahara desert, tends to render general climatic conditions more trying to man and growing crops than is perhaps the case with us.

The Regency admits of being split up into four distinct districts, uneven in size and varying in rainfall, and therefore in agricultural possibilities, viz. :—

1. The extreme northerly district, which may be characterised as very wet, the mean rainfall varying within it from 24in. to 35in. This district consists of a narrow tract of country extending between the Port of Bizerta and the inland town of Beja.

2. The central district, which is described as moist, has a rainfall hovering around 20in.; in area it represents probably about one-eighth of the Regency. This district may be said to lie between the towns of Tunis and Souk-el-Arba to the north and Maktar to the south.

3. Farther to the south we have a vast district described as dry, in which the mean rainfall varies between 12in. and 16in. This district lies between the towns of Sousse, Kairouan and Sfax.

4. Finally, to the extreme south and abutting on the Sahara Desert, we have the very dry district, within which the mean rainfall varies from 4in. to 10in.

Each one of these four districts has its due quota of mountain country, plains, and coastal areas.

Like South Australia, Tunisia does not come within the influence of tropical conditions; hence, from the livestock breeders' point of view, it offers good winter pasture, but is dry and arid over the summer months. The general rainfall distribution is therefore very similar to our own; the great bulk of the rain falls during the winter months, whilst those of summer, apart from occasional thunderstorms, are to all intents and purposes rainless. I take it, however, that the general advantage of climate is certainly with us; for whilst our occasional summer north winds are undoubtedly accompanied by very high temperatures very trying to vegetation, their worst effects cannot compare with the intensity of those of the Sirocco, laden with the grit of the barren Sahara wastes. And when in the course of time the wind veers round to the north, it brings with it little relief. The remarkable falls in temperature accompanying winds blowing uninterruptedly over the ocean from the South Pole, so characteristic of our climate, are quite unknown in Tunisia; for between this land and the cold north lie the summer-heated plains of Southern Europe; all this contributes towards rendering the burden of the agriculturist proportionately heavier. With this reservation, then, I do not know of climatic conditions more closely approaching our own than those of Tunisia.

SOILS.

The total area of the Regency is said to attain to $32\frac{1}{2}$ million acres; of these about $12\frac{1}{2}$ million are arable; about $7\frac{1}{2}$ million more or less sandy wastes; and the balance mountainous rocky country. The arable lands include the usual mixture of heavy and light soils common to all countries, although the heavier types would appear to predominate. As is the case with us, most of the Tunisian soils would appear to be abundantly supplied with both lime and potash; in organic matter they are said to be somewhat deficient, a natural consequence of prevailing climatic conditions; whilst in phosphoric acid, as is again the case with us, they are said to be generally poor.

THE MANURE QUESTION.

From what has been said of soils and climatic conditions, it will be gathered that the "manure question" is in Tunisia very much what it is in South Australia; little or no call for potassic or expensive nitrogenous manures on the one hand, and great need on the other of soluble phosphatic

manures, such as superphosphate. And indeed on all hands one hears the latter highly commended for local purposes, almost to the exclusion of all other manures. The dressing usually recommended appears to be about 2½cwts. to the acre. Notwithstanding the academic praise bestowed on superphosphates in this country, I could find no evidence of their having entered into the general practice of the farming community, as has been the case with us for some years past. Superphosphate is not manufactured in the Regency; hence local usage must be accurately reflected by the local imports of this manure. I find Tunisian imports of superphosphate to have been represented by the following figures within recent years :—

Year.	Tunisian Imports of Superphosphate.
	Tons.
1905	895
1906	928
1907	1,482
1908	1,900
1909 ..	4,888

It is clear that within recent years the imports of superphosphate have shown a tendency to rise; but how infinitesimal a quantity are 5,000 tons. for a country that has under crop each year between 2½ million and 3 million acres.

In this connection it is worth noticing that within recent years Tunisia has joined the ranks of the raw phosphate exporting countries. How important a source of wealth this has proved to the country the following data will serve to show :—

Tunisian Exports of Raw Phosphatic Rock.

Year.	Quantity.	Value.
	Tons.	£
1899	62,379 ..	73,440
1900	168,239 ..	149,925
1901	174,868 ..	162,983
1902	258,798 ..	214,388
1903	345,802 ..	261,168
1904	447,658 ..	327,790
1905	511,859 ..	378,637
1906	770,982 ..	695,960
1907	1,040,808 ..	926,630
1908	1,277,319 ..	1,128,675
1909	1,276,771 ..	1,126,187

It is of course possible that to a limited degree the raw untreated phosphatic rock may occasionally be availed of by Tunisian farmers; indeed I find its use recommended at the rate of 9cwts. to 10cwts. to the acre in lieu

of superphosphate. General conditions, however, of both climate and soil are so similar to our own that I find it hard to believe that the raw rock phosphate will prove any more satisfactory in Tunisia than it has proved to be in South Australia.

It is often stated of Tunisia that in the various cereal crops the proportion of straw present is, as a rule, excessive relatively to that of grain. I learnt with extreme surprise that by way of remedy to this state of affairs the use of organic manures, such as farmyard manure, was being advocated. On Australian experience, one would be inclined to think that the remedy proposed could have but one effect, viz., still further to accentuate the evil complained of.

CEREALS IN TUNISIA.

From the point of view of general agricultural operations, Tunisia may be described as being almost exclusively a cereal-growing country; it forms portion of that country that was formerly known as the granary of Rome. Official statistics show that nine-tenths of the area under yearly crops are represented by wheat and six-row barleys. The relative proportions of these two cereals are said to vary mainly with the mean rainfall of the districts concerned. Thus in the extreme north of the Regency, where the rainfall is always the heaviest, the area sown to wheat is, as a rule, one-third greater than that sown to Barley; in the central districts, in which a 20in. mean rainfall or thereabouts prevails, the areas allotted to each cereal are usually about the same; whilst in the extreme south, where the mean rainfall varies from 8in. to 16in., and where proximity to the Sahara renders the climate exceedingly hot, barley represents about three-quarters of the area under cereals, and wheat only one-quarter. This fact would appear to emphasize a contention of mine, to the effect that in the low-rainfall districts of South Australia six-row barleys will be found to be more resistant to drought than wheat, because the earlier and more rapid growth of the former will generally enable them to escape the full effects of early summer heat and drought.

Independently of questions of rainfall, it is customary in Tunisia to allot to barley the lighter types of soil, and to wheat the heavier ones. And, contrary to general South Australian practice, in Tunisia barley is generally sown before wheat.

The wheats almost exclusively grown in Tunisia are the flinty Macaroni wheats, belonging to the *Triticum durum* section; indeed they appear to be the only wheats ever grown by the native agriculturists. The following are some of the reasons usually given for the exclusive use of these flinty wheats:—Their great resistance to red rust; the fact that they are rarely lodged by rough weather; and that at harvest time they are less subject to the attacks of sparrows and other granivorous birds. The "bird question" has been given a curious solution in Tunisia, which I think worth quoting here. I was told that a public regulation was in existence to the effect that

nobody shall possess in the country a tree the main trunk of which shall exceed 6ft. or 7ft. in height; in other words, for the special protection of standing crops it has been decreed that all tall trees shall be pollarded.

Numerous local varieties of these flinty wheats, all of which are bearded, are cultivated in the Regency, where the impression prevails that they are hardier and better able to withstand adverse climatic conditions than the soft wheats of Europe. Some years back, with a view to testing this fact, I imported from Tunis, for trial at Roseworthy, several of the best known of these varieties. After five consecutive years' experience of them, it may be stated that they did not come up to expectations. I have summarised below in tabular form the results secured at Roseworthy, comparatively with the results secured from King's White grown under similar conditions, and our general farm average.

Yields of Flinty Tunisian Wheats grown at Roseworthy comparatively with the Yield of King's White and the General Farm Average Yield.

Years	1907.	1908.	1909.	1910.	1911.	Average
Rainfall	15.05in.	17.74in.	23.05in.	23.87in.	12.42in.	Yields.
Varieties.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.
Biddee	7 21	15 5	—	—	—	11 13
Msakny	6 24	15 38	—	—	—	11 1
Hmeera	7 15	17 16	27 54	21 18	—	18 26
Mahmoudi	6 41	18 46	36 13	30 1	11 50	20 36
Adjini	8 39	20 25	17 57	21 50	10 54	15 57
Khleefah	—	—	23 41	15 40	—	19 40
Soory	—	—	15 27	6 21	—	10 54
Ahweedjah	—	—	28 25	16 37	—	22 31
King's White	33 10	27 31	29 10	23 27	17 00	26 4
General farm avrge.	13 20	22 14	25 5	16 38	14 17	18 19

It will be noted that these flinty wheats yielded satisfactorily in the wet seasons of 1909 and 1910, but were unsatisfactory in the dry seasons of 1907 and 1911.

The French "Colons" have apparently made various attempts to introduce into the Regency several of the soft wheats of Europe; and it is stated that whilst in favorable seasons the latter have carried heavier yields of grain than the local flinty wheats, the reverse has been the case in the dry seasons normal to this part of the world. Nor could I learn that these soft wheats, which are exclusively grown in Australia, have as yet acquired any particular importance in the farming operations of the Regency. The reason for this condition of affairs is not, I think, far to seek. In the first place, the Mediterranean countries absorb readily enough any surplus of flinty wheats that may be available for export. These wheats, besides being the ordinary foundation of macaroni paste, make a yellowish, dense, heavy loaf, which on the shores of the Mediterranean is more common than the usual European white loaf. Hence the marketing difficulties which we should have to contend

with in Australia do not exist in Tunisia in so far as either type of wheat is concerned ; and the only factor that might reasonably be supposed to lead to the substitution of soft wheats for the local flinty wheats must be represented by an unquestionable superiority in yields of the former. That this superiority in yields of the soft wheats has not yet been established in the Regency appears to me due to the fact that what we should term early varieties have not yet been introduced. I noticed with extreme surprise that the cold country distinction of " Winter " and " Spring " wheats appeared to be accepted in this country. Now a normal winter wheat is very much later than the latest of our wheats, and it does not appear to be realised in Tunisia that in hot countries it is only the spring type of wheat that has any chances of success, providing it be sown in winter. The soft wheats hitherto introduced by the French landowners are said to develop and ripen within 195 to 200 days, corresponding in this respect to the ordinary flinty wheats of the country. The latter, however, from the effects perhaps of long acclimatization, are better able to develop their grain in the teeth of heat and drought of adverse seasons. At Roseworthy we have now had five seasons' experience of these flinty Tunisian varieties, and in our experience they correspond to our mid-season wheats and not to our early wheats. Thus, if we take Mahmoudi and Adjini, which we have grown uninterruptedly for five years—1907-11—we find that on an average their periods of vegetation have been distributed as follows :—

Between germination and bloom	158 days
Between bloom and ripening	38 "
Between germination and ripening	196 "

These figures, it will be noted, correspond to those already given for Tunisia, and tend to confirm the similarity of climate commented upon. If, on the other hand, we take an early variety of ours, such as King's White, over the same period of years and grown under similar conditions, we find its periods of vegetation to have been distributed as follows :—

Between germination and bloom	124 days
Between bloom and ripening	46 "
Between germination and ripening	170 "

It will be agreed that a difference in development of 20 days may affect yields very considerably in years of drought or of red rust. I conclude, therefore, as much of my knowledge of the general circumstances of the country permit me to judge, that the soft wheats are not likely to be accepted to any extent in Tunisia until landowners shall have secured early-maturing varieties such as those in common use in South Australia.

The barley usually grown is an ordinary six-row barley, resembling our Cape barley, but producing, as a rule, a better and plumper sample. Barley in Tunis—as is indeed the case throughout the Mediterranean country—completely supersedes oats as the corn of horses. And quite contrary to

what appears to be the common opinion in South Australia, one hears oats—and not barley—objected to as having over-heating tendencies on the horses of hot countries. Much of the barley grown in the Regency finds its way, I believe, into England for malting purposes. I note that in 1909, England absorbed in this way 1,137,325 bush. of barley, valued at £175,768, or a little over 3s. a bushel. It is stated that European spring barleys and two-row malting barleys have generally failed when tested in Tunisia. I heard of an exceptionally early barley, known as Tripoli barley, occasionally grown in the dry districts of the extreme south and in some salt localities. It is said to mature its grain fully a month earlier than the ordinary local barley, and as such is extremely valuable in dry seasons. The grain of Tripoli barley, however, is said to lack the plumpness of the ordinary local variety.

Some French landowners situated in the heavy rainfall districts of the North, have experimented with oats, and are apparently satisfied with the results; and it appears that efforts are being made to spread the cultivation of this cereal, which is said to yield more heavily than barley. I doubt much, however, that oats are ever likely to oust the latter from its present position, excepting perhaps within the limited area of the heavy rainfall districts. There is a curious advantage that attaches to the growing of oats in Tunisia, a cereal wholly unknown to the Arabs prior to the French occupation. The growing of both wheat and barley is still subject to the old native tax in kind—nominally one-tenth of the yield. Oats, formerly unknown to native chancellors of the exchequer, altogether escape direct taxation, and start therefore with a distinctly favorable economic handicap.

To a very much less degree, in the way of summer grain cereals, maize, sorghum, and durrah are grown, generally over small areas situated within the immediate neighborhood of wells, from which irrigation supplies are drawn. Occasionally when winter cereals have failed, or are likely to prove below the immediate requirements of the native and his family, summer cereals are risked where no means of irrigation are available; and, thunderstorms helping, at times they succeed.

The table below will convey some idea of the importance of the various cereals to Tunisia within recent years.

Mean Production of Cereals in Tunisia, 1907-09.

Cereals.	Average Area.		Average Production. Bush.	Average Yield per Acre.	
	Acres.			Bush.	Lbs.
Wheat	1,068,328	..	5,536,667	..	5 11
Barley	1,152,360	..	7,496,135	..	6 25
Oats	112,500	..	2,927,831	..	26 0
Maize and sorghum .	48,333	..	200,215	..	4 6

The figures in the table above refer to the averages of three seasons; and from our point of view, with the exception of oats, the yields shown are certainly exceptionally low. It should be stated, however, that of the three seasons under consideration, one of them—1908—was characterised by extreme drought, which caused the bulk of the crops in the drier districts to fail almost completely. I notice that in the season that followed the Government was compelled to adopt special relief measures for those who were left practically without means of support. They distributed among native landowners £69,000 worth of seed wheat and barley, and started various forms of relief work for those who were without means of earning a livelihood. Amongst other measures adopted for the purpose, a special new coin was issued of a face value of one centime, *i.e.*, 0.095 of a penny, or about a third of a farthing. This, it was thought, would enable destitute natives to make the infinitesimal purchases that would keep body and soul together.

Nor in considering these yields should it be forgotten that they represent the aggregate results of both Arab and European farming. The farming practices of the Arabs could not be more primitive—representing no advance on those of the ancient Romans. French landowners, on the other hand, have for the last 30 years been endeavoring to adapt improved modern European methods to the special climatic conditions of Northern Africa. In this connection the various problems that have confronted them are very much the same as those we have had to face in South Australia. It does not appear to me, however, that they have been quite as successful in solving them as we have.

ARAB CULTIVATION METHODS.

Weather permitting, the Arab will start breaking up his land with the most primitive of ploughs in the early autumn. In this plough—beam, body, and single handle—all is of wood, with the exception of the iron lance-shaped share, which is no better than a heavy cultivator tine; there is no mouldboard. A plough of this sort can do no more than score on the surface of the earth an irregular series of tortuous open furrows, the mound of earth between each remaining untouched. The absence of mouldboard of any kind implies that the furrow is never turned, nor are weeds ever buried under. Later on in the season the seed is hand broadcasted over the rough surface, and covered by a second ploughing with the same implement, given at right angles to the first. Frequently, however, early autumn rains fail, and the first ploughing cannot then be given. When such is the case, the seed is merely scattered over the surface of the hard, untilled land, and subsequently covered by a single ploughing. As might well be anticipated, crops put in in this fashion are invariably dirty; and if he can overcome his national laziness, the Arab will, at times in the spring, drive out the whole of his family to do a certain amount of hand weeding.

The harvesting tool of the Arabs is the sickle, or reaping hook. They cut off the ears with 6in. to 8in. of straw adhering to them, and waste more time in tying the ears into a short sheaf than they take to gather and cut the latter off. The whole of an Arab's family invariably follow him as gleaners, on the generous principle that the harvest field must support its harvesters. It is stated that in the fields of the natives gleaning operations absorb an amount of grain equal to that sown. Gleaning is therefore a heavy tax on fields which on the average do not yield more than five to one of the seed sown. These small sheaves are gathered together in rope nets made for the purpose, and loaded on the backs of mules or horses, which convey them to the threshing floor. It is stated that in average years each horse load of sheaves yields on threshing about 2bush. of grain, and that in the course of a day's work each horse will make at the outside 10 trips between the field and the threshing floor. The threshing floor is specially prepared by beating to a smooth surface a suitable piece of ground, which has previously been moistened and smeared over with cow's dung. On this floor the sheaves are spread out in even layers. When all is complete, horses are harnessed to a sort of sledge, armed on its under surface with blunt knives, or at times merely sharp stones. The driver stands on his sledge and drives his horses round and round the floor until the grain is judged to be completely threshed out. This method of threshing has a double purpose; it both threshes out the grain and chops up the straw into small pieces, which, with the adhering chaff envelopes of the grain, forms the main standby of native live stock. As in Bible times, it is the wind of the heavens that winnows out the grain of the threshing floor. It is generally estimated that two men and two horses and sledges will thresh out about 15bush. of wheat a day, and about twice as much barley.

EUROPEAN FARMING PRACTICES IN TUNISIA.

The uniformity of practice which characterises the farming operations of the natives cannot be expected in those of the French "colons," for the former have inherited ancestral methods rendered rigid by the experience of centuries, whilst the latter have been groping more or less successfully after new methods during the course of the last 30 years. The average yields of the successful French farmer are naturally superior to those of the thriftless Arab. On the other hand, his general expenses are very much heavier, and it appears questionable at times whether his net profits are very much greater than those of the Arab. It is even stated that on some French farms, in spite of the use of modern implements, yields at times fall even below those of the natives.

One would imagine that the bulk of the country is admirably suited to our general practice of one year's bare fallow before a cereal. So far as the native is concerned it would perhaps be asking too much of his forethought

to expect him to break up land in the middle of one winter, keep it clean throughout one season, and then sow it to wheat the following winter. In some few districts, however, the Arabs appear to break up their lands lightly in spring or summer in anticipation of the rains of the following year. This practice, however primitive, is nevertheless quite exceptional. In this connection, however, the general practice of the French landowners does not, to our ideas, appear very much better. Many of them apparently wait for the autumn rains to break up their land for seeding purposes. It is true that this work is carried out with modern ploughs, and to this extent is better done than that of the Arabs. The most advanced amongst the colons practice what they call "spring ploughing," but make no attempt apparently towards working down the land to a suitable condition of tilth, or maintaining it free from weeds. Nowhere did I come across what we should call well tilled fallow land ready to receive the winter seeding which was surely at hand. Further proof of this, were it needed, is to be found in the fact that the seed drill, universal with us, can find no place in Tunisian agricultural practice, mainly, it is stated, because at seed time Tunisian fields are far too rough in condition to admit of the use of the drill.

In an official report (*La Culture des Cereales en Tunisie*) I find set out a statement representing the cost of growing wheat in Tunisia to the French landowner. I give this estimate below in all its details, because it throws some curious sidelights on the type of cultivation that appears to have received official sanction in the Regency.

Cost of Production of an Acre of Wheat in Tunisia.

	£	s.	d.
Two years' rent on land valued at £6 8s. at 4 per cent. per annum..	0	19	3
<i>Spring Ploughing—</i>			
1½ days of six bullocks, i.e., 9½ days at 9½d.	£0	7	8
1½ days ploughman at 2s.	0	3	2
1½ days driver at 1s. 2d.	0	1	11
<i>Summer Ploughing—</i>			
1½ days of four bullocks, i.e., 4½ days at 9½d.	£0	3	10
1½ days ploughman at 2s.	0	2	5
		0	12 9
Seed, 75lbs. at 4s. 4d. a bushel		0	6 3
Ploughing before seeding (same as summer ploughing).....		0	6 3
Two harrowings at 1s. each		0	2 0
One rolling		0	1 0
Binding, stooking, and carting		0	8 0
Threshing and carting to railway station.....		0	4 10
General expenses		0	3 2
Total cost of producing and marketing one acre of wheat.....	£3	0	0

Thus, then, according to the compiler of this estimate, with labor at from 1s. 2d. to 2s., it costs the French landowner £3 an acre to produce and market an acre of wheat; and he adds that a yield of 13½ bush. of wheat, at 4s. 4d. a bushel, barely covers out of pocket expenses. It is hardly worth while

criticising this estimate, so copious in the details of some operations, so meagre in information concerning others. It might otherwise be pointed out that several important items appear to have been overlooked, such as superphosphate, which elsewhere the same writer strongly recommends at the rate of $2\frac{1}{2}$ cwt. to the acre, the cost of seed distribution, &c.

This estimate, however, if at all representative of general Tunisian practice, gives us a very fair insight into what is thought to be good preparation of the land for wheat. In the spring of the year, when presumably the bulk of the feed has been fed down, we see a plough team of six bullocks, in charge of a ploughman and a driver, tearing up the land at the rate of little over half an acre a day. For the power and labor engaged this is, indeed, slow work; and we must infer therefore single-plough work, and great depth of ploughing at that. No further provision appears to be made for later treatment of the land, until it is ploughed a second time in summer with a team of four bullocks, under sole guidance of the ploughman, and this time at the rate of about five-sixths of an acre a day; evidently, therefore, still slow single-furrow work. It would appear that after this summer ploughing the land is left in the rough loose state until seeding time, when it is ploughed a third time—at the rate of five-sixths of an acre a day. In the circumstances we need have no further reason to wonder that at seed time land so treated should be found too rough for the drill; indeed, to our mode of thinking, it must be a matter of considerable surprise that land tilled on the lines indicated can ever be made to carry a payable crop of wheat, excepting perhaps in the most favorable of seasons. One can understand, too, that at times the yields of the European farms should fall below those of the natives with their primitive methods.

For harvesting purposes the French landowners make universal use of the mower and binder and steam-threshing machinery. I have heard Arabs deploring the practice. "It left nothing behind in the field for the poor," they said. Apparently Australian complete harvesters have been tested in Tunisia, and it is said been found wanting. It seems probable that they were not placed in the hands of men familiar with their working. Apart altogether, however, from any question of their efficiency in the harvest field, I am more than doubtful of the general usefulness of the complete harvesters in a country in which labor is always abundantly available, and in which cereal straw is valued as an essential bulk foodstuff for livestock, in conjunction with barley grain, and occasionally oats.

FORAGE CROPS.

From what can be gathered, it would appear that the question of "forage crops," using the term in its widest acceptation, has always been an acute one in the Regency; nor, apparently, have any appreciably forward steps towards its solution as yet been taken. Although the rank spontaneous

growth of land temporarily out of cultivation is occasionally cut and sun-dried, good hay, in the European sense of the term, is rarely if ever made. Nor has Tunisia yet realised that in dry countries the wheat field must contribute its own share towards its upkeep in the shape of wheaten hay. In glancing over various discussions that have been published on the subject one is very forcibly impressed with the notion that where forage crops are concerned the French colons appear to be particularly anxious to get something for nothing. The chief, and perhaps the exclusive, aim of Tunisian agriculture appears to consist in getting under grain crops every year as vast an area as circumstances permit of; and effort and labor expended in any other direction is not only begrudged but not even to be entertained. On the other hand, the association of livestock with general farming operations is as consistently advocated in Tunisia as it is with us. Indeed I find this association repeatedly referred to as the only economic measure calculated to restore some measure of fertility to soils exhausted by centuries of cultivation. But if all efforts are to be limited to the production of grain crops sold off the farm, how are livestock to maintain themselves, even when reduced to the strict minimum of ordinary working horses? Apparently in the better districts some of the landowners occasionally have recourse to oaten hay, with which vetches are sometimes mixed; but even this practice I have seen gravely censured, on the grounds that oaten hay could not be grown without the aid of tillage, which might have been employed to better advantage in the raising of saleable grain crops.

As is the case with us, when land is left out of cultivation in Tunisia it carries very tolerable winter feed, representing to the livestock of Arab owners a short-lived horn of plenty. In the six or seven dry months of the year, however, annuals make no further growth, except in a few favored spots; and, when what little is available on the stubbles has been consumed and trodden under foot, livestock not only lose condition but must face inevitable starvation, unless relieved from the hoarded stores provided by the forethought of man. And with the natives these never go very far; the small heaps of chopped straw and chaff that accumulate round the native threshing-floors are usually doled out with occasional handfuls of barley to their working horses and bullocks. Sheep, on the other hand, earn their livelihood on foot. In charge of knowing shepherds they roam from one end of the Regency to the other in search of food, which is paid for either in kind or at a fixed rate per head. On the whole, even in the most favorable of years, the condition of the livestock of the Arabs is usually deplorable by the beginning of winter; whilst in years of drought they die away like flies, or may be purchased for a mere song.

In some respects the French landowners are even less favorably situated. They may be said to have endeavored to adapt themselves to the methods of the Arabs, without, however, possessing the inherited instincts of the

latter to turn them to best advantage. The flock of the French colon, for instance, cannot travel when feed gives out on his own land, except in the care of the Arab shepherd, who alone possesses the necessary experience of the available feeding grounds; and when at a distance he is apt to think more of his own special interests than of those of his master, for ancient custom has decreed that he shall be part proprietor of the flock. And since the time of Jacob this arrangement has always proved a rather one-sided one. Hence the opinion very common in Tunisia that sheep are profitable only in the hands of an Arab proprietor.

The French proprietor, albeit possessed of inherited Western forethought for the morrow, is almost equally at a disadvantage where the feeding of horses and horned cattle are concerned. In this special direction the adoption of modern tillage and harvesting machinery has not improved his lot. They have converted his stubbles into less valuable feeding grounds than those of the natives, in which without particular difficulty sheep can find the means of gleaning even behind the gleaners; whilst the long straw and summer growth of the native stubbles are of value to horses and cattle alike, besides returning to the soil some portion of the humus, so essential to its good mechanical condition in all hot dry countries. The French landowner, in the great majority of cases, owns no hay; but he knows that for centuries, in the absence of natural feed, the Arabs have fed their horses and cattle on straw and a little barley grain. Hence he thinks himself compelled to follow the example of those who alone are possessed of secular experience; and in the neighborhood of every French farm steading we see accumulating huge stacks of straw to meet the supposed requirements of the farm livestock. But the question arises, is it straw that the Arab feeds to his livestock? Is it not rather mainly the chaff envelopes of the grain, which are admittedly of greater feeding value, mingled with grain that has escaped slovenly winnowing processes, together with a little crushed and bruised straw? Whatever may be the case, there is little doubt but that both horses and cattle take more readily to the straw heaps of the Arabs than to the clean straw of the French threshing machines. The French landowner grows wheat more readily than barley, and oats only in favored localities; and unfortunately the hard stick-like straw of the flinty wheats usually grown, always fed long, is the type of straw least acceptable to livestock. Hence the French landowner finds himself compelled to meet the acknowledged defects of his straw as a foodstuff with abnormally large rations of barley; all of which, in the long run, has a tendency to shear away what may be left in the way of net profits.

Without hay as a standby, and with perhaps even less natural summer feed than we can boast of in South Australia on an average Lower North farm, it is easy for us to realise the difficulties of the Tunisian farmer who would combine livestock operations with the growing of crops. Notwithstanding well-intentioned official advice to the contrary, in actual practice I fancy

that the average French colon reduces his livestock to the irreducible minimum of unavoidable working horses. Indeed I heard that one farm, at all events, had even gone a step further in a more or less successful attempt entirely to replace working horses by electricity. It is true that one hears that cattle are occasionally found grazing with advantage on some of the favorably situated farms of the northern districts of the Regency. For the most part, however, these represent more or less dubious speculations rather than systematically legitimate associations of livestock and farming. In the main, I think, it may be stated without exaggeration, that for the present the flocks and herds of the Regency continue in the hands of the Arabs.

I notice that unirrigated crops of maize and sorghum are recommended for summer forage purposes. It appears to me, however, that apart from exceptional seasons, these crops are no more likely to prove advantageous than is generally the case with us in the Lower North. Kale and the forage cabbages generally appear also to have their special advocates. No doubt, under careful management, these winter crops will afford later grazing than the spontaneous weed growth of a field temporarily out of cultivation; and to that extent they may prove helpful. They cannot be said, however, to solve the problem of a suitable supply of summer feed. Vetches, too, appear occasionally to be grown, either alone or in conjunction with oats. It is customary to utilise them in the form of hay, trusting to a good grazing aftermath, in the event of a showery summer.]

In the extreme south of the Regency, in the neighborhood of holy Kairouan, where droughts are rather the rule than the exception, for many generations the Arabs appear to have cultivated for forage purposes the spineless prickly pear. Magazine writers are very fond of attributing the creation of this plant to the magic skill of Luther Burbank; as a matter of fact it has been in cultivation long before the American plant breeder saw the light of day. This useful cactus, once well established, is said to be altogether indifferent to the nature of soil in which it is planted, and equally so to drought and extreme heat. I have myself seen it flourishing on the summit of a ruined Roman aqueduct, some 30ft. to 40ft. from the ground. The spineless prickly pear offers an abundant supply of succulent feed at a time of the year when nothing else is available. The flat sections of the stem are detached and chopped up into suitable slices; apparently only every other year, for fear of injuring the general growth of the plant. It seems a pity that this spineless cactus should not have been given a trial in some of our drier districts; there is no doubt that in times of drought it would prove of inestimable value.

The making of ensilage appears to be officially advocated, particularly in so far as adventitious rank spring growth is concerned. I could not learn, however, that farmers had taken to the practice whole-heartedly.

SULLA.

Sulla, or as it is known here, Spanish or Maltese clover, *Hedysarum coronarium* of botanists, is a forage plant indigenous to Tunisia, as also to much of the littoral country of the Mediterranean. Within recent years it has received much attention in the Regency, and as it may possibly present some interest for us, I have reserved for it a special place in the discussion of forage crops.

This plant, which is somewhat akin to sainfoin, is found growing spontaneously in the northern districts of the Regency, i.e., in districts in which the mean rainfall may be said to vary somewhere around 20in. It is at its best in rich alluvial flats, on which it makes strong rank growth, sometimes attaining to 3ft. and 4ft. in height; whilst on dry hill slopes it is more or less stunted, but still offers very good grazing. Like all leguminous plants it appears to call for a good supply of lime and phosphoric acid in the soil, but appears to be more or less indifferent to its humus contents.

Sulla, like all the leguminosæ, carries on its roots special swellings, in which are to be found nitrogen-collecting bacteria, living in symbiosis with the plant. It is stated that these bacteria are of a type peculiar to sulla, and generally not to be found in soils in which the plant had not been previously grown. In soils of this kind the growth of sulla is said to be very poor until the bacteria have been artificially introduced. I notice that in Tunisia it is recommended that when new land is being laid down to sulla, about 3 tons to the acre of surface soil from an old sulla field should be scattered over the surface of the field in cloudy, moist weather. I may add that for some years past we have grown sulla on a small scale on the Roseworthy Agricultural College Farm, and have as yet experienced no particular trouble in this direction.

There are said to be several varieties, or perhaps even species, of sulla. So far as can be seen, however, the differences adverted to do not appear greater than might be expected from a general change of environment.

Sulla is stated to be normally in Tunisia biannual, or even at times annual. Our experience of it at Roseworthy would tend to show that it is perennial so long as it can be maintained alive through the summer months.

A field of sulla may either be grazed or cut for hay. It makes a rather coarse hay, which needs very careful handling, because of its tendency to lose its leaves on drying, as is the case with lucerne hay. The hay yields appear to vary within fairly wide limits, from a little over a ton to the acre to 4 tons and 5 tons in very favorable conditions.

Sulla appears to be grown fairly regularly in both Malta and Southern Italy, and for some years past French landowners have been endeavoring to find a place for it in the rotation of Tunisian crops; as yet, however, its position does not appear to have been definitely settled. Thus some would sow sulla in a cereal crop, very much in the same way as red clover

is sown in England in a spring barley, or as lucerne is sometimes sown by us in a cereal crop. Others again, following the usual Maltese practice, prefer sowing it on a cereal stubble.

Connected with the position to be given to sulla in ordinary farming operations are certain germination difficulties which can be most conveniently dealt with here. Sulla seed is enclosed in an outer shell or husk, endowed with strong powers of resistance to the ordinary agents of decay, whence arises a very tardy and irregular germination. So much is this so that it is said that for successful growth sulla in the husks must be sown a year in advance of actual requirements. Thus, if sulla seed in the husk be sown in an autumn cereal it will not germinate until 12 months later in the stubbles of the cereal crop. This fact naturally represents a serious difficulty in the handling of the crop, and various attempts have been made to overcome it, some of which may be quoted.

It would appear that Maltese and Sicilian growers are in the habit of storing away the seed for 12 months in an air and water tight pit, in which a sort of fermentation sets up, with the result that the grain, when sown, germinates fairly freely. M. Schribaux recommends boiling the seed. According to him seed and husks immersed for 5min. in boiling water will show a 95 per cent. germination as soon as brought in contact with moist earth; whilst 10min. immersion gives rise to a 75 per cent. germination. The seed should be sown within 48 hours of treatment. M. Wartelle has modified this treatment by immersing the seed for an hour in a 1 per cent. solution of carbonate of soda, or washing soda, at a temperature of 122° F. According to him, this treatment has been responsible for an 85 per cent. germination. M. Delanoue found that by merely exposing the seed in its husks to the action of summer weather throughout the summer months he obtained in the following autumn an 85 per cent. germination. Hence he recommends the sowing sulla seed in the husks over a cereal stubble as soon as the field is free of harvesting operations, and that without covering it. Apparently moderate grazing of the stubbles in the summer months does not interfere with the regular germination of the seed in the following autumn, on the fall of the first rains.

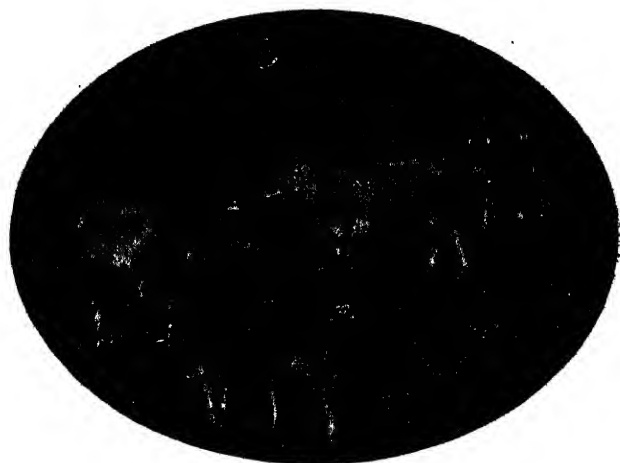
Finally, milled seed, freed of the husks by a special mechanical process, may now be secured. It is said that they give rise to an 80 per cent. germination shortly after sowing. Unfortunately milled seed is very much more expensive than the seed in its husks.

I owe these details on the germination of sulla to an article from the pen of M. R. Thillard, published in the 1909 *Annuaire* of the *Ecole Coloniale d'Agriculture de Tunis*.

Is sulla likely to prove of any use to us in South Australia, and if so, how should it be handled? This is a question which cannot very well be answered without definite experiments on the subject. I am inclined, however, to

think that in 20in. rainfall country, and on good land, it is likely to prove useful either as a grazing crop or as a leguminous hay crop. We have already grown it at Roseworthy in the past, but do not appear to have understood its general management. I propose, therefore, giving it a fairly extended trial, although perhaps our rainfall conditions are somewhat below what appear to be the special requirements of sulla. The seed, either milled, or, if in the husk specially treated as indicated, should be sown in a cereal hay crop at the rate of 13lbs. to 16lbs. to the acre if milled, and at the rate of 60lbs. to 70lbs. to the acre if in the husk. It should be broadcasted after the drilling in of the cereal hay crop, rolled in with a corrugated roller if the seed is milled, and lightly harrowed in if it is in the husk. Germination will take place at the same time as that of the cereal crop, in the shelter of which sulla will make fair growth. It will be cut down at the same time as the hay crop, to which it will prove a useful addition. It will probably be wiser not to graze the stubbles in the summer, and on the fall of the first autumn rains the sulla will make rapid growth, and become available for grazing early in winter. Or again, the sulla may be allowed to make full growth and be cut for hay when in full bloom. Whether the plant will persist in the ground as a perennial plant remains yet to be proved. If merely grazed, however, it seems probable that in ordinary circumstances it will find the means of going to seed, and reappear from time to time in the field in which it had been sown originally.

(To be continued.)



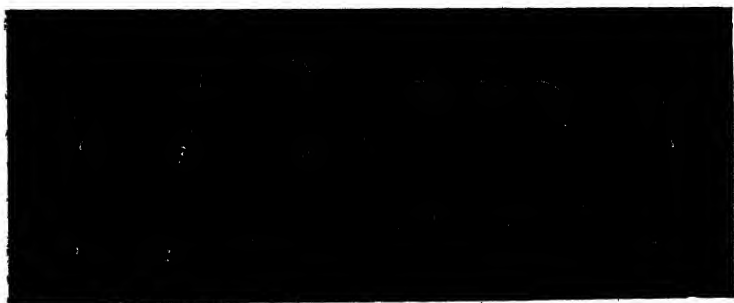
INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the enquirer must accompany each question. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

TICKS AND LICE ON POULTRY.

"Farmer," Petersburg, asks how to rid fowls of ticks and lice.

Reply—Dip in Cooper's sheep dip, same strength as for sheep; or by applying olive oil three parts, kerosine one part, mixed. To prevent re-infection you must eradicate the vermin in the poultry houses and roosts. If the birds roost in trees the trees will be infested; if so, scrape off loose bark and apply kerosine. The poultry houses should be built of iron and kept clean by use of kerosine.



DISEASES OF FARM ANIMALS.

BY OFFICERS OF THE STOCK DEPARTMENT.

RESPIRATORY DISEASES IN HORSES.

(Continued from page 817.)

THE RESPIRATORY SYSTEM.

The organs of respiration comprise the nasal cavity (nostrils), the pharynx and larynx (throat), the trachea (windpipe), the bronchi (tubes), and the lungs. The lungs are the central organs in which the exchange of gases between the blood and the air breathed into the lungs takes place, the other parts of the system are passages by which the air passes to and from the lungs.

Respiratory diseases in the horse affect all parts of the respiratory apparatus, and are named according to the part involved by the disease. The most severe diseases are those affecting the lung; the least severe are those affecting the nasal cavity. In this article disease affecting the nasal cavity will be first dealt with; then disease of the other respiratory organs in their proper sequence, the last disease to be dealt with being pneumonia, or inflammation of the lungs.

COMMON COLD IN HORSES (CORYZA).

This is a very common disease amongst horses, and is seen amongst horses that are stabled and also those running at grass.

Causes.—Independent coryza is most frequently produced by cold, and is usually seen in spring and autumn. It is most marked in limp, pampered, and youthful horses. It may occur secondarily to other respiratory troubles, or even be in association with them—as in laryngitis and pharyngitis—in which case the cause is often bacterial.

Symptoms.—The mucous membrane lining the inside of the nose appears at first hot and dry, and may be somewhat spotted with small irregular blood-

red spots (petechial). A few days later a discharge is seen issuing from the nose, usually a bilateral discharge, *i.e.*, involving both nasal cavities. This discharge is at first of a watery consistence, later becoming thicker and slimy, and finally becoming opaque and pus-like (purulent). Dried crusts of purulent material are usually seen adhering to the skin in the vicinity of the nose. The disease usually lasts from a week to a fortnight, according to the severity of the symptoms.

Treatment.—As a rule cases of coryza recover without a very great amount of treatment. It is necessary that the animal be put in a clean, well-ventilated box, free from draughts, and cleanly and properly bedded down with straw, or any other clean and suitable material. In feeding, green feed should be given where possible, and fed in small quantities at a time, otherwise the feed would be contaminated by the discharge from the nostrils and would be unpalatable to the animal. A liberal supply of clean drinking water should be allowed, which, like the feed, should be constantly replenished. Medicinal treatment is only needed in the more severe cases where there is an abundant discharge from the nose, loss of appetite, and fits of shivering. Then an inhalation of the vapor caused by pouring eucalyptus oil on to a hot brick is beneficial. The nose should be gently sponged out with a clean sponge, and all dry material adhering to the margin of the nostril removed. The bowels can be regulated by small doses of Epsom salts dissolved in the drinking water.

PHARYNGITIS AND LARYNGITIS (SORE THROAT).

These two conditions are so often associated that they will be described together.

Causes.—Cold is the principal cause. The drinking of very cold water, inhalation of cold air, severe chill, standing in draughts and cold winds often causes the condition. Just as with common cold, it is most often seen in limp, pampered, and delicate horses. It usually occurs in the early spring and late autumn. It is often associated with other respiratory diseases, such as coryza and bronchitis. Sometimes it is caused by the inhalation of irritating vapors, and gases, and smoke. At other times the disease is due to injury of the pharynx and larynx (throat) by foreign objects, such as wood, wire, &c., in the feed. Bacteria also often act as the cause of sore throat.

Symptoms.—The first recognisable symptom is coughing. This is most pronounced after exertion, eating, or drinking, or if the horse is brought from a warm stable out into the open air. The laryngeal region is very sensitive, and on manipulation of the throat with the fingers the animal coughs. Owing to the amount of swelling present in the throat swallowing and breathing are difficult, and sometimes a roaring or whistling noise can be heard as the animal breathes. As the disease progresses the animal holds the head and neck somewhat stretched out, and a discharge appears from one or both nostrils.

Treatment.—The disease can be prevented in most cases by proper care being taken of horses at that time when the vital forces are so low, *e.g.*, in the late autumn and early spring. Horses should be stabled in warm, well-ventilated stables, free from draught, and rain-proof. After having been driven a horse should not be left shivering in the cold or rain. They should have a liberal allowance of clean feed, free from foreign objects, such as wood, stones, &c., and should have an abundant supply of clean wholesome water.

The medicinal treatment consists of warm, moist compresses applied to the throat and retained in position by loose bandages. Steam, which has been medicated by the addition of a few drops of eucalyptus oil or friars balsam, should be used for steaming the nose and throat. An operation for the temporary relief of a horse suffering from laryngitis is that of tracheotomy; but as it requires a considerable amount of surgical skill in its performance, it should only be done by a properly qualified veterinary surgeon.

BRONCHITIS.

Causes.—One of the main causes of this complaint is cold. The disease is usually met with in damp, cold weather, when changes in temperature are rapid, and during the prevalence of moist, cold winds, thick mist, and fog. As in sore throat, it is usually seen in the late autumn and early spring. Sometimes the inhalation of strong gases, smoke, dust-laden air, or spores from mouldy or fungi-infected hay will cause the condition. Spreading of an infection from the upper air passages (nose and throat) will cause bronchitis. Sometimes it occurs as an accompanying symptom of other respiratory diseases. It is often bacterial in origin and sometimes parasitic.

Symptoms.—Usually there is elevation of temperature; pulse is quickened and breathing accelerated. Appetite is scanty. The cough—usually a very prominent symptom—is at first very dry, painful, and distressing, gradually becoming moist and looser. In very severe cases discharge may occur through the nose. The disease usually lasts from one to three weeks.

Treatment.—The animal should be placed on a diet of green feed, and a liberal supply of clean drinking water allowed, in which loz. of Epsom salts and one drachm of saltpetre to the bucketful have been dissolved. The surroundings should be clean, well lighted and ventilated, and free from draughts. A mixture consisting of ammonium chloride and tartar emetic mixed with treacle in medicinal doses should be smeared on the tongue three times a day. The horse should be rugged if the weather is cold.

BRONCHO-PNEUMONIA (CATARRHAL PNEUMONIA).

Causes.—The causes of this disease are the same as those operating in the case of bronchitis. More often, however, it is caused by a spreading of the infection from bronchitis along the bronchial tubes to the lung substance.

Symptoms.—The first symptoms are those of bronchitis, from which this disease invariably develops. There is elevated temperature, showing a great deal of fever and accelerated respirations with short, sharp, and shallow cough. As a rule there is not a very great quantity of discharge from the nose unless complications such as sore throat occur. Appetite is scanty, and the horse has a very distressed appearance. The course of the disease is generally slow, averaging from a fortnight to a month, or even longer.

Treatment.—The dietetic principles laid down in considering the treatment of bronchitis apply with equal force in the treatment of broncho-pneumonia. The animal should be fed on fresh green feed, and should be supplied with plenty of clean drinking water. Medicines which have the effect of lowering the temperature, as well as heart stimulants, are indicated. As a stimulant three wineglasses full of brandy, suitably diluted in water, can be given. The medicines recommended for bronchitis should be given, careful attention being paid to their administration in a proper and careful manner.

PNEUMONIA.

Causes.—The two principal external causes are over-exertion and cold. Exposure to damp, cold weather; housing in damp stables; exposure to cold after exertion and consequent chill are fruitful sources of pneumonia. Sometimes it may be due to the horse inhaling fumes from chemicals, as chlorine and sulphurous acid. Inhalation of dense smoke will often prove sufficient to bring about pneumonia. Another fruitful source of pneumonia is that caused by the maladministration of fluid medicines. The pouring of medicine into a horse's nose, as is customary with "quack" horse doctors, is especially liable to produce pneumonia, owing to the liquid passing along the windpipe into the lungs. Such actions as pulling out the tongue, closing the nose with the hand, strapping up the throat tightly, holding the horse's head up too high and pouring in too great a quantity of fluid at the one time while drenching, do not assist the horse in swallowing in any way, and are likely to bring about coughing and choking and passage of the fluid drench along the wrong channel, pneumonia resulting. Pneumonia is often caused by the spreading of diseased processes from neighbouring organs. It has been caused by the horse inhaling the spores of fungi-infected fodder. It is often bacterial in origin and sometimes parasitic.

Symptoms.—The temperature is considerably raised; sometimes it is as high as 106° F. This high temperature usually remains constant for about a week, being then followed by a rapid fall. The pulse and respirations are accelerated. The appetite is usually dull, but in some cases remains good throughout. The animal usually stands with forelegs widely apart, and seldom during the course of the disease lies down. There is a short cough, somewhat painful, and there is often a reddish-yellow discharge from the nose. There is considerable lung dullness over the affected area.

Treatment.—In this disease, as in the case of most respiratory diseases of the horse, medicines play quite a secondary role. Medicines are only needed to counteract the fever and to stimulate the circulatory and other systems. The chief thing is proper dietetics and careful nursing. Green feed should be given in plenty, and a plentiful supply of good water should also be available. An ounce of Epsom salts and two drachms saltpetre should be dissolved in the drinking water twice a day. A mixture composed of medicinal doses of ammonium carbonate, powdered camphor, nitrate of potassium, and powdered gentian made into a thick syrup with treacle can be given three times a day by smearing it over the tongue and gums with a smooth flat stick. Rubbing the sides of the chest with stimulating liniment is also of benefit. However, unless the case is a particularly severe one strict attention to dietetic principles will render more assistance than the indiscriminate administration of drugs.

(To be continued.)



"Blue Ribbon of Turretfield."

MANURIAL TESTS.

SADDLEWORTH.

[Conducted by Mr. Fredk. Coleman.]

On this farm 16 half-acre plots were mapped out at the commencement of the tests, and one-half of the plots were fallowed each year. By taking care to place the same manurial plots in precisely the same position each alternate year it will be seen that a set of permanent experimental plots has been evolved, and the results of these will be increasingly valuable as the years go by. As a result of Mr. Coleman's careful and patient work we are in a position as a result of six years' work to know with some accuracy the manurial requirements of land similar to that at Saddleworth. Table I. summarises the results—

TABLE I.

COMPLETE & INCOMPLETE MANURES FOR WHEAT YIELDS.—(F. Coleman, Saddleworth.)

Year.	PLOT 1. 1cwt. Mineral Super. per Acre.	PLOT 2. 1cwt. Mineral Super., 5cwt. Lime per Acre	PLOT 3. 1cwt. Min. Super., 1cwt. Sulph. of Potash, 1cwt. Nitrate of Soda per Acre.	PLOT 4. 1cwt. Bone Super. per Acre.	PLOT 5. No Manure per Acre.	PLOT 6. 1cwt. Mineral Super. 1cwt. Sulph. of Potash per Acre	PLOT 7. 1cwt. Sulph. of Potash, 1cwt. Nitrate of Soda per Acre.	PLOT 8. 1cwt. Mineral Super., 1cwt. Nitrate of Soda per Acre.
	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.
1905	31 0	29 45	33 45	34 30	29 45	35 0	30 45	33 15
1906	32 15	34 15	32 15	34 0	23 45	33 30	24 45	36 15
1907	35 45	38 30	39 15	36 15	24 45	35 30	25 15	35 45
1908	17 30	19 30	21 0	17 30	7 30	19 30	9 0	19 0
1909	31 45	33 0	35 0	30 45	24 30	29 30	23 15	33 30
1910	21 0	22 30	25 15	26 30	15 15	28 45	15 30	29 30
1911	21 54	24 0	24 40	23 44	15 30	24 6	15 34	20 40
Average for 7 years ..	27 19	28 47	30 10	29 10	20 9	29 24	20 35	29 42

The increased returns from the manured plots, over the return from that which was not dressed in any way (plot No. 5), were as under—

Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 6.	Plot 7.	Plot 8.
bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.
6 24	8 30	9 10	9 14	8 36	0 4	5 10

This table demonstrates that the greatest increase was obtained from a dressing of 1cwt. of bone super. as applied to plot No. 4, which was followed very closely by that of plot No. 3 dressed with 1cwt. mineral super., $\frac{1}{2}$ cwt. sulphate of potash, and $\frac{1}{2}$ cwt. of nitrate of soda.

Plots No. 6 (1cwt. mineral super. and $\frac{1}{2}$ cwt. sulphate of potash) and No. 2 (1cwt. mineral super. and 5cwts. lime) also showed a considerably enhanced return. It is, however, necessary to see that the increased yield is not bought at too great a cost, and the table below shows the value of the increased yield from the dressed crops, together with the cost of the manure used, which must, of course, be deducted from the value of the increased yield in order to ascertain the most profitable dressing to apply—

Plot	1	2	3	4	5	6	7	8
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.	s. d.	s. d.
The value of the increased yield at 3s. 5d. per bushel	1 1 11	1 9 0	1 11 4	1 11 6	—	1 9 4	0 3	18 9
The cost of the manures per acre applied in each case	0 4 0	0 9 10	0 18 0	0 5 6	—	0 11 0	14 0	11 0
The net increased return over unmanured plot	0 17 11	0 19 2	0 13 4	1 6 0	—	0 18 4	loss 13 9	7 9

From the above it will be seen that the application of 1cwt. of bone super., in the case of plot No. 4, yielded a net increase in value of £1 6s. over the return from the unmanured plot, demonstrating that, under conditions similar to those met with in Saddleworth, 1cwt. dressing of bone super. was the most profitable manure to apply.

Next in order of merit was the return from the plot No. 2 (treated with 1cwt. mineral super. and 5cwts. lime), which was followed closely by plots Nos. 6 and 1 in that order, with plots Nos. 3 and 8 also showing an appreciable increase. One feature is worthy of note in connection with plot No. 3. The value of the increased yield from this plot was £1 11s. 4d., but the cost of the manure (1cwt. mineral super., $\frac{1}{2}$ cwt. sulphate of potash, and $\frac{1}{2}$ cwt. nitrate of soda), viz., 18s., very considerably decreased the net dividend. Plot No. 7 ($\frac{1}{2}$ cwt. sulphate of potash and $\frac{1}{2}$ cwt. nitrate of soda) showed a direct loss of 13s. 9d. on the application, emphasizing the contention that the application of phosphate of lime in some form is indispensable in the practice of manuring.

WHEAT VARIETIES TEST.

Variety tests have been carried out by a number of farmers with wheat for grain and for hay. The results are shown below; and where figures were available from previous years the whole test is shown and the average yield of each variety stated.

No. 1.—NARRIDY.

[Conducted by Mr. W. F. Nicholls.]

Manure used—1cwt. mineral super. per acre.

Variety.	Yield.					
	1910.		1911.		Average 2 Years.	
	bush.	lbs.	bush.	lbs.	bush.	lbs.
King's Red	22	44	27	47	25	15
Gluyas	19	51	26	49	23	20
Bunyip	22	59	24	28	23	43
Yandilla King	25	23	22	43	24	3
Federation	13	31	22	9	17	50
Rainfall from seed to harvest ...	13.82in.		11.76in.		12.79in.	

Commenting upon these plots, Mr. Nicholls says—"The early wheats have this season easily eclipsed the later varieties, leaving Federation to take last place. This variety, not only in the plots, but throughout this district, has proved distinctly unsatisfactory this year, its proneness to disease seeming to make it an unsuitable wheat in this locality. The take-all, so destructive last year, was almost totally absent this season; a fact which bears out an old theory that this disease is favored by a superabundance of moisture. The rain which fell during the growing period of this year was 11.76in. including 2.36in. in the month of May, the greater portion of which fell before the wheat was sown. The early varieties were almost entirely free from disease of any kind; but red rust did considerable damage to the Federation and Yandilla King, which were also affected by the unfavorable ripening conditions. Less than 1in. of rain fell between the 1st of October and the time the grain was reaped."

No. 2.—WILMINGTON.

[Conducted by Mr. J. Schuppan.]

Manure—1cwt. mineral super. per acre.

Variety.	Yield.					
	1910.		1911.		Average.	
	bush.	lbs.	bush.	lbs.	bush.	lbs.
Federation	7	3	21	17	14	10
Yandilla King	7	37	19	41	13	39
King's Red	9	33	16	53	13	13
Bunyip	9	25	16	46	13	5
Steinwedel	—	—	16	32	—	—

Mr. Schuppan reported that all the wheats were free from rust excepting Federation, and this variety was not sufficiently attacked to affect the yield. All the plots suffered in the dry spell at the end of August and in September, and the yield was consequently a good deal lower than would have been expected before the dry spell. The Yandilla King had to combat oats, and the Steinwedel was somewhat handicapped by the proximity of some trees.

No. 3.—HAMMOND.

[Conducted by Mr. T. Griffin.]

Manure used—60lbs. mineral super. per acre.

Variety.	1908.	1909.	1910.	1911.	Average.	No. of Years.
	bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.	
Special Comeback	— —	17 30	27 0	5 20	16 37	3
Cumberland	— —	15 30	22 15	5 8	14 18	3
Federation	8 45	14 30	28 15	5 9	14 10	4
Gluyas	7 15	16 45	24 45	4 20	13 16	4
Viking	8 0	16 30	21 30	8 6	13 32	4
Yandilla King ...	7 45	12 45	22 0	6 9	12 10	4
Bunyip	— —	— —	— —	5 42	— —	1

Mr. Griffin reported that Viking stood the dry year best of these varieties, with a yield of 8bush. 6lbs.

The rainfall from seedtime to harvest was only 5.83in., as against 14.39in. in the previous year.

VARIETY TESTS FOR HAY AND GRAIN.

ALDINGA.

[Conducted by Mr. T. Pengilly.]

Mr. T. Pongilly has been conducting a combined grain and hay test since 1908, whereby the yield of a given set of plots has been expressed as hay and as grain. The plots were sown in the usual manner; but at harvest one-half was cut and weighed as hay whilst the remaining half was allowed to mature and was reaped for grain.

The seed was sown with 1½ cwt. bone super. in 1908-10 and 1 cwt. in 1911.

[illegible]

AVERAGE YIELDS FOR FOUR YEARS.

Variety.	Hay.			Grain.	
	tons.	cwts.	lbs.	bush.	lbs.
Gallant	2	8	54	15	8
White Tuscan	2	16	52	17	58
Triumph	2	1	46	15	41
Yandilla King	1	15	104	14	28

It will be noticed that the yields for the year under review were, so far as the hay was concerned, below the average in each case where the variety had been grown for two or more successive years, thus making a comparison possible. With the grain, the yield from Triumph was well above the average, while the return from Gallant was slightly better than the average yield for the four years over which it has been grown.

Huguenot, as a hay wheat, was far ahead of the other varieties with a yield of 2 tons 15cwts. 30lbs., the next best being Gallant with 2 tons 5cwts. 30lbs. to its credit. This variety also yielded a good grain crop, viz., 15bush. 56lbs., which stamps it as being a good general purpose wheat.

Mr. Pengilly stated that the crops were somewhat affected with frost during the early stages of their growth, which, to some extent, was responsible for the lower yields.

KANGAROO ISLAND.

Plots were laid out in the hundred of Seddon with a view to ascertaining the effect of different manurial dressings on various crops on very poor ironstone country. Six plots were sown with Dun oats and dressed with manures as set out in the table given below, which also shows the returns—

Plot.	Manure.	Seed.	Yield.	
		bush.	bush.	lbs.
1.	{ 2cwts. super.	1	10	4
	{ 1cwt. blood			
	{ ½cwt. potash			
2.	Do.	2	5	24
3.	2cwts. super.	2	4	20
4.	No manure	2	0	14
5.	{ 2cwts. super.	2	7	26
	{ 1cwt. blood			
6.	{ 2cwts. super.	2	6	19
	{ ½cwt. potash			

Before artificial manures can take effect on this country a heavy dressing of lime must be applied, which was not done in this case.

YONGALA VALE.

[Conducted by Mr. J. H. Chigwidden.]

At Yongala Vale comprehensive experiments were carried out for the purpose of ascertaining (a) the relative values of deep and shallow ploughing,

(b) the manurial requirements of the land, and (c) the effect of rolling or harrowing crops after the plant had come up.

The following table sets out the results:—

Deep v. Shallow Ploughing.

Plot.	Cultivation.	Manure.	Yield per Acre.	
			bush.	lbs.
1.	Deep ploughing, 6in.-7in.	1cwt. mineral super. per acre	22	29
2.	Shallow ploughing, 4in.-5in.	do.	20	33

Manurial Test.

Plot.	Manure.	Yield per Acre.	
		bush.	lbs.
3.	1cwt. mineral super.	20	49
4.	No manure	13	23
5.	{ 1cwt. nitrate of soda 1cwt. sulphate of potash }	20	48

Harrowing v. Rolling after crop is up.

Plot.	Cultivation.	Manure.	Yield per Acre.	
			bush.	lbs.
6.	Harrowed twice after well up	1cwt. mineral super. per acre	18	40
7.	Left as sown	do.	19	7
8.	Rolled once after well up	do.	19	27

All the plots were 2 acres in area, and in each case 1bush. of Federation seed wheat per acre, unpickled, was sown.

(To be concluded.)



ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, March 13th, there being present Messrs. Chas. Willcox (chair), C. J. Valentine, G. F. Cleland, J. W. Sandford, Jno. Miller, G. R. Laffer, Prof. Perkins, and G. G. Nicholls (Secretary).

MEMORIAL TO JOHN RIDLEY.

The Secretary reported that a letter had been received from Mr. F. J. Fisher (of Messrs. Fisher & Culross, solicitors), stating that some clients of his desired to give £1,000 to found a scholarship or something of the sort at Roseworthy Agricultural College to commemorate the name and achievement of Ridley, inventor of the Ridley reaper. They would expect the Government to subsidise the amount pound for pound, as the University Council did when scholarships were founded at that institution. Mr. Fisher added that the matter had been left in his hands, and he would be glad to meet a representative or representatives of the board to discuss it. Members spoke in appreciative terms regarding the generous offer, and agreed that Professor Perkins (Principal of the College), Messrs. G. F. Cleland, and the Chairman (Mr. A. M. Dawkins) should wait upon Mr. Fisher as suggested, with the object of formulating a proposal to be brought under the notice of the Minister of Agriculture.

LIFE MEMBERSHIP.

The Secretary mentioned that at the Conference of the Northern Branches of the Agricultural Bureau at Crystal Brook recently the Minister of Agriculture (Hon. T. Pascoe), as a delegate from the Whyte-Yarcowie Branch, suggested that the branches should be permitted to appoint as honorary life members men who, for a number of years, had rendered valuable services to the organization and to the district in which they lived. Eventually it was decided, at the instance of Mr. G. F. Cleland, that Branches should be empowered to recommend to the Board the names of any members, with a view to their being appointed life members.

STUBBLE BURNING.

A letter from the Utera Plains Branch (Eyre's Peninsula) requested the Board to "Ascertain from the other Branches whether they are in favor of

legislation being enacted to allow all district councils to fix the days and hours when stubble may be burnt." It was pointed out that in some districts burning operations could with safety be carried out much earlier than in others. Mr. G. R. Laffer informed the Board that the Cherry Gardens Branch considered that the period specified in the Act was absolutely dangerous in the hills, and believed that the power to fix the dates should be vested in the local governing bodies. On the recommendation of Mr. Laffer it was resolved to communicate with the various Branches, suggest that they should discuss the matter, and send their delegates to the Farmers' Congress in September, prepared to adopt whatever course might be thought desirable.

POLITICAL SUBJECTS.

Attention was directed by the Secretary to correspondence which had passed between the Board and the Bute Branch with reference to the prohibition against the discussion at meetings of the Bureaus of political subjects, which the Board had decided included a proposal emanating from the Branch named relatively to the formation of a rural employers' defence association. Mr. Nicholls explained that another letter had been received inquiring in what manner the Board considered the topic named a political one, and stating—"We do not consider the question of a political nature, but one of pure economics, which seriously affects the progress or retrogression of the agricultural industry." It was decided to receive the communication, and reiterate the previous determination of the Board.

PLACE OF NORTHERN CONFERENCE.

A resolution was received from Wirrabara Branch that the Annual Conference of Northern Branches should be held each year at Gladstone, all Branches to share expenses.

The reason advanced was that the railway facilities would allow delegates from nearly all Branches to attend and return within a reasonable time.

On the motion of Mr. Laffer it was decided that as the matter had been dealt with at the Conference held at Crystal Brook recently, and the principle of holding at various centres confirmed, the Board could take no action in the matter.

DEMURRAGE CHARGES.

Suggestions were received from the Nantawarra and Willowie Branches that the Railways Commissioner should be asked to allow stationmasters to notify consignees promptly on arrival of goods in bulk—either by collect wire or through the post.

It was decided to place the matter before the Railways Commissioner.

NOXIOUS WEEDS.

The following resolution from the Mount Remarkable Branch was read by the Secretary:—"That it is desirable that the administration of the Noxious Weeds Act should be vested entirely in the Advisory Board, and that any inspector appointed should live away from the district in which he operates." Mr. Nicholls said at the Congress in September last the same subject received attention, and, as a result of a resolution, the Minister of Agriculture was asked to take steps to have the administration of the Act placed under the control of the Department of Agriculture. The then Minister (Hon. J. P. Wilson) announced later that the whole matter would be dealt with during the next Session of Parliament. Professor Perkins suggested that the present Minister should be apprised of the position, and asked to consider the resolution previously forwarded, and to intimate whether the matter would be dealt with next Session. This course it was decided to adopt.

NEW BRANCHES.

Approval was given to the formation of Branches at the undermentioned places, with the following gentlemen as members:—

Parilla Well.—T. Burford, T. H. Burford, — Coon, G. McCormack, W. Johnston, S. J. Johnston, W. Foreman, F. Foreman, A. Kelly, J. Ferguson, D. Ferguson, C. Gum, W. Powell, W. Austin, H. Austin, — Leak, — Leary, L. J. Neville.

Orroroo.—Messrs. H. L. Brice, T. H. P. Tappscott, R. C. Sharp, W. W. Collins, W. Forster, J. C. Hagger, — Hook, — Shillaber, H. S. Fisher, H. J. Cottrell, L. R. Cottrell, J. T. Northcott, E. Copley.

NEW MEMBERS.

The following gentlemen were approved as members of the undermentioned Branches:—Redhill—Messrs. W. Stone, G. A. Button; Parrakie—Messrs. W. H. F. Bastian, F. L. Dayman, C. E. Hammond, N. Good; Georgetown—Mr. A. T. Hewett; Lameroc—Messrs. — Kain, A. C. Batten, K. Cameron, F. L. Mathias, A. V. Steer; Mount Barker—Messrs. B. Barker, A. C. Daw, J. Morris, Dr. M. L. Scott, P. Fox, W. H. Salmon, D. L. G. Monfries; Coorabie—Mr. C. Hobbs; Waikerie—Mr. R. Stanley; Utera Plains—Mr. H. Hill; Morchard—Mr. G. Richards; Narrung—Messrs. J. L. Harwood, H. E. Bottrill, S. M. Hunt; Yadnarie—Mr. Fred Stubing; Pinnaroo—Messrs. E. H. Parsons, A. R. Noltinius, B. H. Nash.

POULTRY NOTES.

By D. F. LAURIE, Poultry Expert and Lecturer.

OPERATIONS FOR APRIL.

Moulting.—As the hens moult and reappear in a new suit of feathers a number of them should be drafted into the breeding-yards and mated with vigorous cockerels, with a view to an early supply of chickens. Old birds may fail to moult properly. All these should be yarded together—males separated from females—and fed on food containing a high percentage of fat. Sunflower seed, if obtainable, is excellent for the purpose. Stewed linseed is also very valuable, if not used to excess. It should be slowly cooked, until the bursting seeds form a jelly. Of this use a little in the mash daily. Linseed (flax seed) is rich in oil. Not only does this have the effect of hastening the shedding of the old feathers, but it also provides material for building up fine hard plumage. Use plenty of green food, especially cabbage, kail, and green mustard, all of which are rich in sulphur, which is one of the constituents of the feather. Sweep up all loose feathers and burn them. See that the birds are well sheltered from cold winds and draughts. Use Douglas mixture in the drinking water. For particulars see my "Poultry Manual," price 7d. posted, obtainable from Government Printer, Adelaide.

Scaly Leg.—Nothing is more objectionable nor so unsightly as scaly leg, and yet one sees it in most poultry yards. The trouble is due to a small mite (*Sarcoptes mutans*), and is spread from one bird to another. Scaly-legged broody hens will pass the trouble on to the chickens. The following cure is simple and efficacious:—With a stiff brush and hot soapy water thoroughly scrub the legs and feet of the affected bird. Dry with a soft rag, and then apply and rub in a good coating of soft soap. A second treatment will not be necessary for a long time. The houses and perches should be well drenched with a good germicide.

Long Spurs and Claws.—Breeders often neglect these matters. Many fowls are kept under conditions where there is no natural wear to keep down the growth of claws, and in a number of breeds the spur develops considerably. Claws and spurs should be cut off to reasonable proportions. Round and smooth off the cut ends. If bleeding occurs sear with a red hot iron. Among

utility breeds spurs are neither useful nor ornamental. When the cockerels are a few weeks old apply a stick of caustic potash to the moistened end of the budding spur; this will generally prevent development.

Dubbing Stud Birds.—By this term the breeder understands the removal of the comb and also the wattles. As a rule, even in our laying strains, the cockerels have overgrown combs and wattles. In the jungle fowl ancestor these appendages are not nearly so pronounced. Combs and wattles are secondary sex characteristics, but are not essential to any act of reproduction. Large combs and wattles require a large blood supply, which is a tax on the bird. The weight of the comb and the awkwardness of the over-developed pendulous wattles seriously affect the bird, and prejudice his value in the stud pen. The practice of removing these appendages is becoming very general. I prefer using for the purpose a sharp, clean pair of curved scissors. Burn, in a tin, a good supply of brown paper—the ash is a fine styptic, and is antiseptic. Let some person hold the bird firmly under his arm, so that he can neither flap his wings nor struggle. Hold one lobe of the wattle and cut off close to the jaw. Do the same with the other; never mind appearances, no harm is done. To remove the comb, press the thumb of the left hand against the roof of bird's mouth; start at the front of the comb, cut low and follow the shape of the head. One long cut will suffice. A few snips to trim off little knobs will finish the job, which should be over in half a minute. Now plaster the bleeding portions with the black ash of the burnt paper. The birds suffer little, if any, pain, and on being released will start crowing. In a week the head and wattles are beginning to get red again. Pen each bird separately after the operation. Feed as usual.

The Yards.—Repair all yards, and see that there are no holes in the netting and that it is fastened securely at the bottom. It should be buried at least 6in. in the ground and laced to a stout wire. This will prevent dogs and foxes from scratching under. Hinges of gates should be oiled and the fastenings put in good order. Clean out all rubbish. Fork over the soil and rake level; remove and cart away a few inches of the surface soil where the fowls are wont to congregate, and renew with fresh sweet soil.

The Houses should be cleaned out and the old soil of the floors removed and remade with fresh soil. The most sanitary floors are of 3in. reinforced concrete (use a layer of wire netting). Over this place 6in. of loose soil, and then a good supply of scratching material. Exterminate all vermin by the use of a good insecticide. See that ample provision is made for ventilation, but take care to avoid draughts. Plenty of clean convenient nests in secluded positions should be provided.

The Stock.—Discard all unprofitable stock and replace with birds bred for a purpose. If for egg production, obtain these of a good laying strain; if for meat production, select the medium and heavy breeds, and avoid all

very large or very small specimens. Select a few good ones in preference to a number of unknown quality.

Test your Pullets.—If you desire to build up a strain of first-class laying hens you must breed only from tested hens mated with a male bird bred from good layers. Those desirous of so doing can, on application, obtain an illustrated pamphlet describing the methods of procedure. Among even the good laying strains there are to be found poor layers as well as first-class layers. You should breed from the best only.

Size in Leghorns.—When selecting your breeding stock you should reject the bantam-like specimens. A fair percentage of our White Leghorns are too small. It is better to sacrifice a few eggs per hen at the beginning, if thereby you gain a more vigorous strain of fowls.

Do not neglect to breed table fowls of good quality. There is a splendid local demand, and well-grown properly-fattened chickens of good quality bring high prices. Leghorns, and the light breeds generally, are not suited to the purpose. The cockerels sell at good prices when poultry for the table is scarce. Undersized farm mongrels are of little value compared with those of approved kinds, which are just as easy to breed.

Fresh Stock should be procured without delay. If you defer your purchases all the breeders will have sold their best, and you will only get the culls. For breeding stock procure good second season hens, and see that their legs are not scaly, and that they are free from vermin and disease. Ducks should be about 18 months to two years old, and may be mated with vigorous well-grown young drakes not under eight months.



EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST

WORLD'S RECORD ESTABLISHED.

FINAL REPORT.

ROSEWORTHY POULTRY STATION.

The eighth test terminated on Sunday evening, March 31st. There were in all 126 pens of fowls, of which 100 pens of White Leghorns and one pen of Black Minorcas were included in Section I. devoted to light breeds. In Section II, there were 25 pens of the medium and heavy breeds, viz., 15 pens Black Orpingtons, two pens Buff Orpingtons, one pen White Orpingtons, four pens Silver Wyandottes, and three pens of Langshans. The results are summarised in the following table :—

SUMMARY OF RESULTS.

Number of pens	126
“ birds	756
Total number of eggs laid	133,093
“ value of eggs laid	£545 6s. 2-7d.
“ cost of feeding	£188 14s. 9-5d.
Profit over cost of feeding	£356 11s. 5d.
Average market price of eggs per doz.	11-8d.
“ number of eggs laid per pen	1056-29
“ “ “ “ hen	176-04
“ cost of food per pen of six hens	£1 9s. 11-5d.
“ cost of food per hen	4s. 11-5d.
Profit over cost of food per pen	£2 16s. 7-3d.
“ “ “ “ hen	9s. 5-2d.
Eggs laid by winning pen, Section I.	1,589
“ “ “ “ II.	1,189
Highest monthly score, Section I.	163
“ “ “ “ II.	135
Highest weekly score, Section I.	40
“ “ “ “ II.	38
Highest average per hen, pen 98	264-83
“ score, pen 98	1,589

A comparison of the performances of the various breeds is seen in the next table. The superiority of the White Leghorn as a layer is again manifest, and our old friend the Langshan is also prominent in the second section.

BREEDS AND AVERAGES.

The following table shows details of the egg-production of the various breeds concerned, and their averages :—

No. Pens.	No. of Birds.	Breed.	Total Eggs Laid.	Average per Pen.	Average per Hen.
100	600	White Leghorns.	108,472	1,084.7	180.7
1	6	Minorcas.	1,001	1,001	166.8
15	90	Black Orpingtons.	14,502	966.8	161.1
2	12	Buff Orpingtons.	1,710	855	142.5
1	6	White Orpingtons.	824	824	137.3
4	24	Silver Wyandottes.	3,641	910.2	151.7
3	18	Langshans.	2,943	981	163.5

The outstanding feature is the splendid score (1589) made by the leading pen, which has established a new world's record. The owner, Mr. Ray Walsh, has an up-to-date poultry farm at Caulfield, Victoria. He keeps all his birds on the scratching shed principle, and feeds scientifically. The parents of these pullets were bred by Mr. A. H. Padman, of Hyde Park, who established the previous world's record at Subiaco and Gatton. South Australia is thus interested in this great victory of the Victorian breeder.

South Australia has a splendid climate, and is in every way suited for profitable poultry-breeding. Good markets are also available. There is an unlimited and growing demand for eggs and poultry. The annual value of our poultry products is now about £650,000, and of this we send to the other States and England £150,000 worth each year. There is no reason why both amounts should not be increased tenfold within the next decade. From 756 fowls, which included good, indifferent, and bad layers, a total return has been received, at ordinary market prices of the eggs, of £545; the cost of food was £188, and the balance £356. A farmer keeping half this number of good fowls should make at least three pounds (£3) a week after allowing full value for the food used.

KYBYBOLITE.

The second test has terminated, and all concerned have reason to be well pleased with the excellent results. It has been asserted that the South-East is not suited for egg-production. This test has proved conclusively that given good fowls and a proper system of feeding it is still of paramount importance to house the birds in a manner suitable to so rigorous a climate.

In the following table are given the results, which compare very favorably with other tests. The South-East should, in the not distant future, become

one of the chief sources of fine eggs and table birds of the best quality for the world's markets.

SUMMARY OF RESULTS.

Number of pens	47
“ birds	282
Total number of eggs laid	45,710
“ value of eggs laid	£187 5s. 8d.
“ cost of feeding	£78 0s. 5d.
Profit over cost of feeding	£109 5s. 3d.
Average market price of eggs per doz.	11s. 8d.
“ number of eggs laid per pen	972.5
“ “ “ “ hen	162.08
“ cost of food per pen of six hens	£1 13s. 2.4d.
“ “ “ “ hen	5s. 6.4d.
Profit over cost of food per pen	£2 6s. 5.9d.
“ “ “ “ hen	7s. 8.9d.
Eggs laid by winning pen, Section I.	1,464
“ “ “ “ “ II.	844
Highest monthly score, Section I.	151
“ “ “ “ “ II.	133
Highest weekly score, Section I.	39
“ “ “ “ “ II.	35
Highest average per hen, pen 1	244
“ score, pen 1	1,464

The winning pen, owned by Messrs. Moritz Bros., of Kalangadoo, put up a record for Kybybolite—1,464—a most excellent performance, and ranking this year second to the phenomenal score at Roseworthy. Messrs. Moritz Bros. are breeders of sterling merit and a credit to the South-East. They won in the local section last year, and in addition to winning at Kybybolite this year have also annexed the special prize for greatest weight of eggs laid, and have secured fourth prize at Roseworthy.

THE 1912-13 TESTS.

Roseworthy.—A record, 136 pens, have been entered. The test is open to the world. All the States except Tasmania are represented; New Zealand has contributed two pens.

Kybybolite.—This year the competition is confined to breeders in the South-East, and a fairly satisfactory entry of 35 pens was received.

Victorians look upon Roseworthy as the “Melbourne Cup” among the world's competitions.

FARMERS SHOULD HELP.

Farmers are poorly represented in these tests. This is a reproach to a body of men who should do more to foster one of the most important industries in the State. If our Agricultural Bureaus would take the matter up and nominate pens representing each Branch or locality I would be prepared to recommend a separate section and good prize money.

Will secretaries please note that copies of the full official report will be available in a few weeks, and may be had on application to the Poultry Expert.

DETAILED SCORES.

Following are the complete scores in the two tests :—

ROSEWORTHY.

[Started on April 1st, 1911, and terminated March 31st, 1912.]

Competitor.	Eggs Laid for Month ended March 31st.	Total Eggs Laid from April 1st, 1911, to Mar. 31st, 1912.
SECTION I.—LIGHT BREEDS.		
WHITE LEGHORNS (except where otherwise noted).		
The Range Poultry and Egg Farm, Toowoomba, Queensland ..	95	1,257
Cosh, A. J., Normanville	81	1,234
Cowan Bros., Burwood, N.S.W.	52	1,190
Hamill, H., Kogarah Bay, Sydney	92	1,158
Rhodes, H. G., Brompton	52	882
Collings, O. A., Riverton	75	1,240
Hay, C., Normanville	82	1,229
Stevenson H., Port Melbourne, Victoria.....	58	1,029
Pope, F., jun., Rockleigh	37	876
Malthouse, James, Normanville	82	1,168
Moritz Bros., Kalangadoo	115	1,289
Whetstone & Knappstein, Clare	68	1,034
Lampe, Bert, Kadina, S.A.	74	1,054
Collings, O. A., Riverton	76	1,269
Bertelsmeier, C. B., Clare	103	1,270
Bond, A. J., Clare	78	1,051
Moritz Bros., Kalangadoo	91	1,166
Waite, F. J. Osborne, Nailsworth	71	1,007
Ellery, J., & Son, Clare.....	87	1,227
Kempster, T. E., Lilydale, Victoria	74	977
Kinnear, Mrs. A. E., Hyde Park.....	67	1,070
Steer, W. J., Port Pirie West	61	965
Fitz-Gerald, Gerald, Mordialloc, Victoria	91	1,119
Featherstone, Mrs. M. A., North Croydon.....	86	1,026
Lawson, Miss N., Lower Mitcham	77	1,071
Provis, Mrs. W., Eudunda	72	1,103
Steed, J. F. T., Woodville	76	1,146
Uren, Mrs. P. A., Kapunda	102	1,319
Codling H., Mitcham Park	75	1,033
Provis, W., Eudunda.....	86	1,079
Pedder, E. A., Burnside	67	1,116
Tockington Park Poultry Farm, Grange.....	73	1,087
Swann, V. Roy, Jamestown	64	826
Miels, C. & H., Littlehampton.....	92	1,022
Wondatta Poultry Farm, Eudunda	40	741
Purvis, Master James, West Glanville	98	1,142
South Yan Yean Poultry Farm, South Yan Yean, Victoria....	81	987
Sargenfri Poultry Yards, East Payneham	70	1,092
Mazey, Phillip, Alberton.....	61	1,090
Padman, A. H., Hyde Park	114	1,297
Hill Chas., Monarto South	84	1,030

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended March 31st.	Total Eggs Laid from April 1st, 1911, to Mar. 31st, 1912.
SECTION I.—LIGHT BREEDS—Continued.		
WHITE LEGHORNS (except where otherwise noted).		
Read, J. D., Springhurst, Victoria	73	1,059
Mildren, D., Clare	34	1,173
Eckermann, W. P., Eudunda	102	1,224
Hurford, E. W., Grangeville	96	1,246
Sargen's Poultry Yards, East Payneham	59	1,078
Shepherd, R. H., Balaklava	78	1,099
Rice, J. E., Cottonville	61	1,108
Burden, H. P., Balaklava	53	1,106
South Yan Yean Poultry Farm, South Yan Yean, Victoria	70	1,145
Keddie, R. A., Woodside	49	1,032
Purvis, Miss Gracie, West Glanville	95	1,200
March, H. S., Kapunda	81	1,115
Mildren, D., Clare	74	1,135
Hill, Chas., Monarto South	43	901
Marshall, J. W., Moonta	79	1,153
Hollands, Iru, Moonta	85	1,168
Dyer, P., Woodville	59	1,141
Edgar, R., Moonta	52	1,140
Hocking, E. D., Kadina	32	989
Purvis, W., West Glanville	67	1,212
Carling, R., Kangaroo Flat	99	1,217
Howlett, H., Moonta	90	1,116
Addison, Mrs. A. L., Malvern	91	1,072
Menkens, F. H., Henley Beach	59	1,173
Haines, T. F., Fullarton Estate	73	1,061
James, Wm., Croydon	47	964
Pettigrove, T. A., Northcote, Victoria	83	1,109
Read, J. D., Springhurst, Victoria	31	874
Riordan, D., Kent Town	84	982
Kappler Bros., Marion	86	1,094
Bertelsmeier, C. B., Clare	93	1,202
"Koonoowarra," Enfield	103	1,132
Marrson & Smith, Prospect	63	1,109
Connor, D. C., Gawler	35	1,031
Thistle Stud Poultry Farm, Quorn	76	1,114
Uren, P. A., Kapunda	93	1,143
March, H. S., Kapunda	60	1,099
Navan Poultry Farm, Minlaton	37	844
Holmes, F. A., Frances	73	1,040
Lillywhite, R. G., Dulwich	57	1,049
Burden, Mrs. M., Islington	17	901
Coombes, E. R., Silverton, N.S.W.	72	1,165
Curtis, G. R., Mitcham	69	1,035
Roche, Mrs. N., Middle Brighton, Victoria	26	862
Mitcheson, R. H., Prospect	51	1,132
Hannaford, F. E., Monteith	79	1,048
Belcher, P. A. S., Georgetown	55	915
Whitrow, A. J., Knoxville	84	1,110
"Eurima," Kybybolite	49	865
Kalms, A. G., Eudunda	54	1,012
Counter, E., & Foreman, Hindmarsh	33	848
Morton, T. W., East Moonta	54	832
Hall, T. C., Rose Park	56	934

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended March 31st.	Total Eggs Laid from April 1st, 1911, to Mar. 31st, 1912.
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SECTION I.—LIGHT BREEDS—*Continued.*

WHITE LEGHORNS (except where otherwise noted).

Ontario Poultry Farm, Clarendon.....	89	1,047
Biggs, W. D., Hyde Park.....	95	1,119
Tomlinson, W., Clarence Park.....	60	945
Redfern Poultry Farm, Caulfield, Victoria.....	163	1,589
Sickert, P., Clarence Park.....	69	1,204
Bennett, W. C., Magill.....	64	1,141
Franklin, G., Kent Town (Minorcas).....	61	1,001

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTON.

Brundett, S., Moonee Ponds, Victoria.....	87	1,068
Phillips, A., Portland, S.A.	99	983
Cowan Bros., Burwood, N.S.W.	71	993
Hutton, C., Parkside.....	71	854
Bertelsmeier, C. B., Clare.....	46	754
Tookington Park Poultry Farm, Grange.....	59	879
Padman, J. E., Plympton.....	68	977
Killara Poultry Farm, Tyatt, Victoria.....	60	890
Martin, B. P., Unley Park.....	87	1,102
Francis Bros., Fullarton.....	50	943
Bertelsmeier, C. J., Clare.....	66	843
Padman, J. E., Plympton.....	44	896
Killara Poultry Farm, Tyatt, Victoria.....	76	1,047
McKenzie, E., Northcote, Victoria.....	94	1,084
Craig Bros., Hackney.....	80	1,189

BUFF ORPINGTON.

Ross, J. W., Somerton, <i>via</i> Glenelg.....	59	848
Hocart, F. W., Clarence Park.....	72	862

WHITE ORPINGTON.

Sykes & Harvey, Hamley Bridge.....	64	824
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SILVER WYANDOTTES.

Cant, E. V., Richmond.....	69	1,021
Kappler Bros., Marion.....	63	949
Burden, H. P., Balaklava.....	45	854
Redfern Poultry Farm, Caulfield, Victoria.....	63	817

LANGSHANS.

Stevens, E. F., Littlehampton.....	100	985
Jonas, H. D., Broken Hill.....	67	837
Toseland, Geo., Geranium.....	106	1,121

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended March 31st.	Total Eggs Laid from April 1st, 1911, to Mar. 31st, 1912.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS (except where otherwise noted).

Moritz Bros., Kalangadoo	113	1,464
Sudholz, Alf., Kalangadoo	104	1,025
Boyce, J., Kalangadoo	76	1,080
"Mshama," Mount Gambier	75	1,274
"Herdsfield," Mount Gambier	77	1,188
Lewis, C., Bordertown	66	933
Staunton, S., Naracoorte	42	779
Lillywhite, B. G., Dulwich	49	989
Jarrad, J., Mount Gambier	76	1,196
Hall, C. W., Mount Gambier	87	1,166
Sargenfri Poultry Yards, East Payneham	115	1,191
Vorwerk, H. F. & A. C., Millicent	105	1,306
Lacey, F. C., Kybybolite	92	1,159
Kinnear, Mrs. A. E., Hyde Park	80	1,102
Rake, A., Kalangadoo	78	1,107
"Eurinima," Kybybolite	91	939
Smith, R. L., Hynam	102	937
Day, Mrs., Roseworthy	70	977
Scholz, C. H., Kybybolite	76	1,105
Purvis, W., West Glanville	83	1,136
Hannaford, Mrs. F. E., Monteith	96	1,096
Jenkins, Mrs. C. J. A., Kybybolite	72	1,047
Bertelameier, C. B., Clare	66	1,117
Navan Poultry Farm, Minlaton	91	934
Scholz, A. R., Kybybolite	103	1,015
Mohr, S., Tantanolua	81	1,006
Featherstone, Mrs. M. A., North Croydon	66	916
Toseland, G., Geranium	71	935
"Koonoowarra," Enfield	79	981
Palmer, W., Franklin Street, Adelaide	83	922
Cosh, A. J., Normanville	86	989
Queale, W., Lameroc	73	1,026
Tomlinson, W., Clarence Park	98	913
Reed, A. J., Pinnaroo	86	945

SECTION II.—HEAVY BREEDS.

SILVER WYANDOTTES.

McNamara, Mrs. D., Mount Gambier	70	844
Moritz Bros., Kalangadoo	47	663
Staunton, S., Naracoorte	73	774
Burden, H. P., Balaklava	81	860
Vorwerk, H. F. & A. C., Millicent	105	847
Virgo, A. W., Bordertown	65	623

BLACK ORPINGTON.

Smith, W., Hynam	28	575
Phillips, A., Portland, S.A.	46	743
McNamara, Mrs. D., Mount Gambier	51	717
Bertelmeier, C. B., Clare	63	613
Blue Lake Poultry Yards, Mount Gambier	46	787
Bail, H., Kaniva, Victoria	84	783

LANGSHANS.

Toseland, Geo., Geranium	83	938
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D. F. LAURIE, Poultry Expert.

ANALYSES OF FERTILISERS.

The following are further results of analyses made by the Government Analyst (Mr. W. A. Hargreaves) of samples of fertilisers taken since the beginning of the year.

Name.	Phosphate.								Nitrogen.	
	Water Soluble.		Citrate Soluble.		Acid Soluble.		Phosphoric Acid, calculated as Tricalcic Phosphate.		Result of Analysis.	Vendor's Guarantee.
	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.		
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Adelaide Chemical & Fertiliser Co., Ltd.— Thomas phosphate (ex s.s. Albany)	—	—	20.02	20.00	21.32	20.00	—	—	—	—
Norman & Co.— Thomas phosphate (ex s.s. Annaberg) ..	—	—	—	—	—	—	29.80	31.00	—	—
Geo. Wills & Co.— Thomas phosphate (ex s.s. Annaberg) ..	—	—	—	—	—	—	40.41	39.00	—	—
Begot, Shakes, & Lewis, Ltd.— Japanese super. (ex s.s. Shintzu Maru)	38.91	38.40	—	—	—	—	—	—	—	—
Elder, Smith, & Co., Ltd.— Lawes super. (ex s.s. Andre Theodore) ..	36.34	36.00	—	—	—	—	—	—	—	—
Lawes super. (ex s.s. Ercamo)	35.73	36.00	—	—	—	—	—	—	—	—
Hassell, A. H.— "Jap" brand super. (ex s.s. Ethelstan) ..	39.61	36.00	—	—	—	—	—	—	—	—
"Hassell's" guano super. (ex s.s. Ethelstan)	30.56	29.00	1.44	2.00	3.88	4.00	—	—	—	—
Mt. Lyell M. & R. Co., Ltd.— Standard super.	38.67	36.00	—	—	—	—	—	—	—	—
Adelaide super.	36.26	30.00	—	—	—	—	—	—	—	—

GEO. QUINN, Inspector of Fertilisers.

SPEECH DAY AT ROSEWORTHY COLLEGE.

There was a large gathering at Roseworthy College on Friday, March 15th, the occasion being the annual Speech Day. The Minister of Agriculture (Hon. T. Pascoe, M.L.C.) presided, and others present included representatives of the Legislature and the Chairman of the Advisory Board of Agriculture (Mr. A. W. Dawkins).

The Principal (Professor Perkins) submitted an interesting report, in the course of which he stated that since the College was first established as a scholastic institution, 27 years ago, 557 young men had been enrolled on its books, of whom 182 had gained the College diploma. He congratulated the successful students, and stated that very rarely had it been his lot during his '20 years' experience as a teacher to be associated with young men who, as a body, had shown greater anxiety to become possessed of what information he had to offer.

The Minister, Mr. Dawkins, Mr. W. Copley (a former Commissioner of Crown Lands), and the Hon. W. Hannaford, M.L.C., bore testimony to the good work being done at the College, after which Mrs. Pascoe distributed the prizes.

The list of successful students is as follows :—

DIPLOMA LIST.

First-class diploma—George Clarke Love, with honors in agriculture, fruit culture, chemistry, viticulture, dairying, and aviculture. Wilfred Francis Darwin Clark, with honors in agriculture, fruit culture, veterinary science, chemistry, surveying, bookkeeping, viticulture, oenology, and aviculture.

Second-class diplomas—James Henry Fletcher, with honors in agriculture and viticulture; Harold Snow, Reginald Henry Mowat, Rowland Hill, Sydney Harold Thomas Best, Finlay Melrose McDiarmid, John Edward Bruen, Lewis Frederick Wilkinson, John Douglas Hoile, George Ives, Harry Errol Sibley, and Arthur Philip Stone.

Third-class diplomas—Frank Howard Snook and William Keith Tamblyn.

PRIZES.

Third-year students—Gold medal (presented by the Royal Agricultural and Horticultural Society) for highest aggregate in all diploma subjects,

George Clarke Love ; College second prize, Wilfred Francis Darwin Clark ; old students' cup (presented by the Old Students' Association), for highest aggregate in agriculture and veterinary science, George Clarke Love ; œnology prize (presented by Professor Perkins), W. F. D. Clark ; chemistry prize (presented by Mr. W. H. Phillips, B.Sc.), George Clarke Love and W. F. D. Clark, equal ; fruit culture prize (presented by the Albert Molineux Memorial Trust), G. C. Love ; viticulture prize (presented by Mr. H. E. Laffer), W. F. D. Clark ; College prize for best outside work, Rowland Hill ; special prize (presented by the members of the Advisory Board of Agriculture), for highest aggregate in all practical examinations, G. C. Love.

Second-year students—Silver medal (presented by Mr. W. J. Colebatch, B.Sc. (Agri.), M.R.C.V.S.), Cyril Forster Stephens ; College second prize, Hugh Gilmore Cumming ; special prize (presented by the members of the Advisory Board of Agriculture), for highest aggregate in practical examinations, George Vernon Madeley ; viticulture prize (presented by H. Buring, Esq.), Wilfred Driscoll ; agriculture and farm diaries (presented by Professor Perkins), Cyril Forster Stephens ; fruit culture (presented by Mr. H. E. Laffer), Wilfred Driscoll ; College prize, for best outside work, G. V. Madeley.

First-year students—Silver medal (presented by A. L. Brunkhorst, Esq.), Henry Arthur Follett ; College second prize, Alfred Frank Harper ; agriculture and farm diaries (presented by Professor Perkins), A. F. Harper ; book-keeping prize (presented by Mr. H. C. Pritchard), H. A. Follett ; botany prize (presented by A. J. Adams, M.A.), H. A. Follett ; English prize (presented by Mr. A. J. Adams, M.A.), H. A. Follett ; College prize, for best outside work, Leslie James Clarke.



STOOKING HAY AT ROSEWORTHY.

FARMERS' SHEEP.

POINTS FOR CONSIDERATION.

By HENSHAW JACKSON, Wool Expert, School of Mines and Industries.

The question is often asked by farmers as to the most suitable breed of sheep to run in conjunction with their agricultural operations. Advice on the subject is tendered glibly and easily enough by experts and others who have a leaning towards this or that variety of English sheep, and farmers are assured that they cannot make a mistake by going in for any of the breeds mentioned.

What is the farmers' sheep? It may be said at once that all sheep, with the exception of the Merino and the wild mountain breeds, can be placed under that designation, and are to be found on farms in all countries of the world in their different varieties, according to the conditions of soil and climate in the place where they are reared.

Sheep of the various English breeds have been imported to Australia and New Zealand for some considerable time past, and have been found to do very well under the changed conditions of their environment. Their success, however, is and must be largely circumscribed by the amount or area of country whereon they can be bred and reared in accordance with the conditions which prevailed in their places of origin. This aspect of the question is one that has not received the attention it deserves, and the consequence has been that many farmers have plunged into Lincolns, or Leicesters, Shropshires, or Southdowns, because they are mutton sheep, and should for that reason prove profitable in getting lambs for fattening, irrespective of whether the locality where they are to be used is in the remotest degree suitable. This sort of thing, by its failure to produce the expected results, has caused many British breeds of sheep unmerited abuse and proved a set-back to their proper and suitable use by farmers.

In connection with sheep we have to remember that the greater part of Australia is more suitable for the Merino than any other breed, and even in districts where wheat-growing has proved successful the sheep that gives the best returns is still the Merino. In saying this it is not to be inferred that we should dispense with the British breeds of sheep entirely; nor should it be taken that no sheep should be run in conjunction with wheat-growing. On the contrary, have sheep on the farm always, if you wish to get the best results and make every available penny of profit that your holdings will return; but see to it that you have the kind of sheep that is most likely to thrive in your particular district or locality. Because you can grow a wheat crop and obtain fairly good harvests over a succession of years is no reason

why you can also produce to the point of profit lambs suitable for export, or even up to the best standard for local consumption. Where you can, however, do well with wheat in fairly dry districts you can also be pretty certain of getting a good return proportionate to the number of your sheep, from a flock of Merinos.

The raising of fat lambs in the shape of crossbreeds like Lincoln-Merino or Leicester-Merino, or mongrels like Shrop-Leicester or Lincoln-Merino, is to some extent a special branch of industry. To be successful in this the farmer needs special conditions, such as handiness to a market, and most important of all, country where he can be certain of always having a sufficiency of succulent fodder to keep the lambs growing all the time until they are ripe.

A farmer's sheep then, broadly speaking, is the animal that will give him the best returns either in mutton or wool under the conditions that he knows by experience will govern the production of either; and every man, being a farmer, will do well to study those conditions in the most careful manner before he decides which sheep he will rear.



POLLINATION OF FRUIT BLOSSOMS.

THE VALUE OF BEES.

The following interesting paper on the work of bees in the pollination of fruit blossoms has been published by the author, Mr. Cecil H. Hooper, M.R.A.C., South-Eastern College, Wye, Kent :—

The weather during the blossoming period exerts both a direct and indirect influence on the setting of fruit. Even when not injured by frost, the blossoms are often chilled by the cold to such an extent as to interfere with fecundation. Moderate cold renders the "self-fertile" trees "self-sterile"—that is to say, the seeds and fruit do not mature when pollinated with pollen from the same variety of tree—and severe cold renders them sterile to cross-pollination as well. Warm and sunny weather at blossoming time indirectly aids the fertilisation by favoring and aiding insects in their work of cross-pollination. An excessive degree of humidity favors fungous diseases, which may destroy either the blossoms or the young fruit. Dry winds, on

the other hand, reduce the flow of nectar to almost nothing and probably cut down the stigmatic secretion and so interfere with the setting of the fruit. Cold, rainy weather during the flowering time may be disastrous, the rains knocking off the pollen or causing it to swell and burst, and washing away the secretion of the stigma, thus preventing pollination by insects.

For these various reasons fruit will not set unless a reasonable amount of warm, sunny weather occurs during flowering time. The vitality of a tree is often injured and young fruit often killed by fungous diseases which destroy the flowers and the foliage. Such diseases often exert sufficient influence to cause crop failures, such as occur in cherry orchards. Again, the amount of fruit a tree bears one year generally determines the yield the following year, and sometimes all possibility of a crop is cut off by the trees failing to bloom.

Turning to other considerations, the number of insect visitors in any orchard determines to a great extent the amount of cross-pollination carried on. The pollen of pear, apple, plum, cherry, and other fruits is not produced in sufficient quantity, nor is it of the right consistency to be carried by the wind, and the pollination of these trees is therefore dependent on the activity of insects. Honey bees and other members of the bee family are the best workers in cross-pollination, though some other insects assist; thus, ants will sometimes pollinate strawberries, and Professor F. V. Theobald tells me that black midges do much in the pollination of pears. Some fruits, such as the gooseberry and black and red currants, if protected from bees will set practically no fruit, as by the construction of the flower and the adhesiveness of the pollen mechanical means are necessary to carry the pollen to the stigmas. Many other trees, such as most of the apples and pears and some of the plums and cherries, need, in order to set fruit, that their stigmas be pollinated with pollen from a different variety of the same kind of fruit.

Mr. W. F. Reid says, in reference to fruit-growing in London, that it is not the smoke that prevents trees fruiting, but the lack of insects to cross-pollinate them, and quotes an example of pears growing well at Clapham Common, where bees were kept.

As to the various ways in which different varieties of fruits are fertilised, the following notes may be of interest:—

NUTS.—Cobnuts and filberts are wind fertilised. It is therefore important to have plenty of pollen catkins, and in some plantations a special variety, the Cosford cob, which bears many catkins, is planted here and there to ensure there being plenty of pollen. In the case of a nut tree in a garden which has very few catkins, hazel boughs with plenty of catkins may be placed in the tree to provide pollen for the little red stigmas of the female nut blossoms. A plentiful supply of pollen is also necessary in walnut-growing.

GOOSEBERRIES AND CURRANTS.—As to these fruits Messrs. Little and Avery covered certain bushes of gooseberry and red and black currant with muslin to exclude insects. The experiment demonstrated that it was absolutely necessary to have the help of bees, as these protected bushes had either no fruit whatever, or only a very few tiny fruits, whilst those around had plentiful crops, thus showing the importance of bees. Mr. W. O. Backhouse found that the pollen of gooseberry remains in a compact mass, that there is apparently no mechanism to ensure self-fertilisation, and that bees were consequently absolutely necessary to transfer the pollen; and in the case of one variety, "May Duke," so much nectar was secreted that unless drawn off by bees or other insects the anthers were in danger of being swamped. In gooseberries the pollen is found to be shed slightly before the stigma is ready to receive it, but the stigma is ready before the anthers have shed all their pollen. In the red and black currant, the anthers and pistil appear to come to maturity simultaneously. The flowers of gooseberries and black currants are much visited by bumble bees, as well as by hive bees. The bumble bees work later into the evening and in less attractive weather than ordinary bees.

PLUMS.—So far as plums are concerned, experiments made by Mr. W. O. Backhouse lead him to regard the different kinds of plums as on the whole "self-fertile," notably Victoria, Histon Apricot plum, blue bullace and sloe, whilst Rivers's Early Prolific, the old greengage, and Black Diamond show themselves "self-sterile." These, however, set fruit well when dusted with the pollen of another variety, but should not be planted in large blocks alone. In America a variety called "Tragedy" is found to be brought into greater bearing by the presence of Clyman, while Coe's Golden Drop, which is found to be "self-sterile" in both America and Victoria (Australia), fruits better when planted with Satsuma. It seems advisable in England not to plant more than two rows together of the same variety of plum.

CHERRIES.—Bees are of great importance to cherries. This has been very fully demonstrated on a large scale in California, and I should like to mention one example in Kent, told me by Mr. F. Shrivell, of Golden Green, Tonbridge. Close to his house is a large Bigarreau cherry tree, which for many years bore good crops of fruit whilst there was a hive of bees near; but, on account of the bees getting "foul-brood," the swarms were destroyed, and for two or three years there were hardly any cherries. On his restarting the bees, however, the cherry tree again cropped well. In 1910 he lost his bees through inattention and omitting to feed them the previous winter, with the result that the cherry tree's crop was a complete failure—too few to gather. Mr. Shrivell admits the flowering season was very wet, and that it was a bad cherry season, but says if the bees had been on the spot, at every sunny interval they would have been in the trees, and he would have had a far better crop. In Victoria the Early Purple Guigne cherry is found to be

"self-sterile," and in England the black Tartarian cherry has been found not to set fruit when planted alone. Experiments are needed in this country to know which variety of cherry are self-fertile and which self-sterile, and to ascertain whether the setting of cherries is aided by a mixture of varieties enabling cross-pollination.

PEARS.—It would appear from the trials of M. B. Waite in the U.S.A., and F. J. Chittenden in Essex, that two-thirds of our different varieties of pears are "self-sterile." This fact is of great importance, and may account for many trees not bearing, especially where there is no other variety of pear near, nor any bees. The stigma of the pear was found by Waite to ripen before the stamens unless retarded by wet weather, in which case the stigma may remain enclosed by the petals until the stamens have reached maturity or even discharged their pollen. As a result of experiments made it seems that the White Doyenné has proved to be a good polliniser for Williams' Bon Chretien in the United States of America.

A British example may also be given to illustrate the importance of cross-pollination in pears. In a field at Swanley, Kent, I planted 40 Pitmaston Duchess pears, away from other pears. For four years, though flowering well, they did not fruit. I took them up and replanted them in another part of the farm in a small orchard of pears of other varieties, and placed a hive of bees amongst them. The following year they commenced to bear, and have, I understand, borne fairly well and regularly since. Mr. H. F. Getting, of Glewstone, Herefordshire, also finds that Pitmaston Duchess requires cross-pollination. Mr. F. J. Chittenden, out of 16 varieties of pears, only found two, Durondeau and Conference, to set fruit with their own pollen. In America, Duchesse d'Angouleme, Beurre Bose, and Flemish Beauty are "self-fertile."

QUINCE trees set their fruit perfectly with their own pollen.

In **APPLES**, as in pears, the stigmas usually mature before the anthers. Many practical fruitgrowers have observed that certain varieties, if planted in large blocks, do not fruit well. Mr. Charles Martin, of Toddington, finds the best Cox's Orange Pippins are produced in a plantation in which these trees are intermixed with Duchess Favorite, a wonderfully free blooming variety, and apparently a good polliniser, the result being better than where intermixed with Warner's King, or King of the Pippins.

Mr. F. J. Chittenden microscopically examined pollen of over 100 varieties of apple, and found in most varieties 80 per cent. of the pollen perfectly formed. The only well-known variety in which the pollen was not good was Ribston Pippin, in which only about 40 per cent. was well formed. In testing the germination of the pollen a solution of $2\frac{1}{2}$ to 5 per cent. sugar in water was used. In apples it seems probable that in England quite 90 per cent. of the different varieties of apples are "self-sterile." Mr. Chittenden found, out of 24 varieties, that Gladstone, Stirling Castle, and King of the

Pippins were the only kinds that set fruit with their own pollen. Messrs. Lewis and Vincent found in Oregon that Keswick Codlin, Duchess of Oldenburgh, and Washington were "self-fertile." Hive bees, bumble bees, and other wild bees appear to be the chief pollenisers of the apple.

It appears in colder and more exposed climates the number of varieties that are "self-fertile" is proportionately smaller than in districts specially favorable to the fruit.

STRAWBERRIES AND RASPBERRIES.—With regard to these, Mr. C. W. Richardson finds from experiments that most varieties of strawberry set fruit with their own pollen. Bees, nevertheless, would appear to be valuable to a strawberry field, especially in a dull season, though they are not of the same relative importance as they are to apple, pear, plum, and cherry. In strawberries and raspberries the stigmas are receptive before the anthers. Last year I bagged three lots of unopened raspberry flower-buds, on two different varieties, and was surprised later in the season to find the blossoms had set fruit nearly as well as in the open. The raspberry is, nevertheless, a very favorite blossom with hive bees, from the nectar of which they produce a pleasant-flavored, almost colorless, honey.

In conclusion one cannot doubt that greater knowledge of the pollination of our hardy fruits would be advantageous to all commercial fruitgrowers. This knowledge can be gained by observations and experiments made by fruitgrowers in different parts of the country, together with experiment stations and research laboratories. And all sound demonstrable data should be collected and tabulated by some such body as the National Fruitgrowers' Federation.

Whilst it is no doubt right to advise fruitgrowers, from a commercial point of view, to limit the number of varieties they shall grow, knowledge of whether the varieties selected are self-fertile or self-sterile is desirable, as is also knowledge as to whether the varieties are early or late bloomers, because, taking a extreme case, Irish Peach apple and Bismarck are almost out of flower by the time Graham's Royal Jubilee commences, and they would therefore be obviously unsuitable for cross-fertilising purposes. The remarks given here on the influence of the weather on the setting of fruit are taken from an article by M. B. Waite on "The Pollination of Pomaceous Fruits" in the "Year Book" of the Department of Agriculture, United States of America.—*Queensland Agricultural Journal*.

AGRICULTURAL BUREAU.

Conference of Northern Branches.

The Annual Conference of the Northern Branches of the Agricultural Bureau was held at Crystal Brook on Friday, March 1st. The representatives of the Department of Agriculture present were—Hon. T. Pascoe, M.L.C. (Minister of Agriculture), Professor W. Lowrie, M.A., B.Sc. (Director), Professor A. J. Perkins (Principal, Roseworthy Agricultural College), Messrs. D. F. Laurie (Poultry Expert), Henshaw Jackson (Wool Instructor), C. E. Loxton, G.M.V.C. (Assistant Government Veterinary Surgeon), A. M. Dawkins (Chairman), Geo. Jeffrey, and G. G. Nicholls (Secretary) Advisory Board.

The following Branches were represented by the gentlemen below mentioned:—Crystal Brook—H. Billingham, B.A., W. S. Carmichael, M. P. Pavy, W. W. Lovelock, R. Heaslip, W. Robinson, A. E. S. Clarke, J. Forgan, W. J. Venning, G. Sargent, M. Weston, B. Weston, B. Flavel, W. Morrish, G. Davidson, H. V. Sargent, W. Jasper, G. Miele; Mount Bryan—J. Hatherly, E. K. Collins; Whyte-Yarcowie—G. Pascoe, M. Walsh, S. Robinson, E. J. Pearce; Redhill—F. A. Wheaton, L. Trewin, J. J. Haynes, J. McAvaney, P. H. Wheaton, J. L. Prevost; Blyth—W. J. Nines, C. H. Zweck; Yongala Vale—H. F. Schmidt, C. Fowler; Narridy—P. Haren, J. Darley, J. J. Kelly R. Satchell, A. Liddle, J. E. Nicholls; Beetaloo Valley—A. H. Jacobi, A. Bartrum, G. Thyer, F. Bartrum, P. Curton, A. Woolford; Port Pirie—E. B. Welch, C. E. Birks, E. J. Hector, A. M. Laurie, W. R. Wright, E. J. Eagle; Port Germein—W. Head, W. Holman, S. G. Stone; Saddleworth—F. Coleman.

WELCOME TO DELEGATES.

Mr. Billingham (President of the Crystal Brook Branch) welcomed the Hon. Minister, members of the Advisory Board, officers of the Agricultural Department, and the visiting delegates, and called on the Minister to open the Conference.

OPENING ADDRESS.

The Minister of Agriculture (Hon. T. Pascoe, M.L.C.) said it gave him great pleasure to open the Conference, more especially because he felt that a Conference held in that district was a gathering of perhaps the most intelligent class of agriculturists in the State. He was not only present in his capacity as Minister of Agriculture, but prior to his taking office he had been selected as a delegate by the Whyte-Yarcowie Branch. The success of agriculture in South Australia during the past few years was due in a great measure

to the adoption of more scientific methods of handling the soil, and the more intelligent working on the part of farmers. The seasons had not been so very much better, but the farming had been better. During the year the Advisory Board had been working in the interests of farmers. Some time ago it took up the matter of free back carriage of implements from field trials, which trials were frequently held in districts not large enough to hold an agricultural show. The Advisory Board had induced the Railways Commissioner to carry implements sent to and unsold at field trials back to the makers free of charge. The Board had also secured for the farmer a much more reasonable arrangement with regard to demurrage. Farmers living seven miles or more from railway stations were now in a much better position in regard to supplies coming forward per rail than they were formerly.

There were a number of men who had rendered valuable service in their capacities of members of the Bureau, and who were now getting somewhat old to attend meetings regularly. Under the present regulation regarding membership the third lowest on the list of attendance annually automatically retired. Certainly these men were eligible for re-election, but this did not altogether meet the case. Men whose long experience as practical farmers and Bureau members would be of inestimable value to the Branch were sometimes struck off the roll because they felt that their attendance would not be regular. To get over this difficulty he suggested that honorary or life members should be elected.

The Bureau system had done a great deal for South Australian farmers. The educational advantages could never be gauged, but the results were seen in better agriculture and better returns. He had much pleasure in declaring the Conference open.

MILLING QUALITIES OF SOUTH AUSTRALIAN WHEATS.

Mr. Fredk. Coleman (Saddleworth) read the following paper:—"South Australia has failed as yet to establish great goldfields; but probably the discovery of gold in Victoria in 1851, with the rush which followed, was indirectly the cause of thousands of acres of golden grain being harvested in this State; for not only did many settlers return enriched from these goldfields, but, thanks to the escort, gold was sent over here and was used in buying more land and in equipping the farms for wheat-growing. For it had been shown that South Australia could not only grow but had actually produced the best wheat in the world. Grain grown on the Bald Hills on the slopes of Mount Barker had just won the highest award at the great Exhibition in London in 1851, this triumph being subsequently confirmed by a similar success at Paris and at Vienna also. South Australians are justly proud of the premier position which they occupied 50 years ago. Can we claim to hold such a position to-day? Wheat is still our chief product. Our farmers have won a great reputation as wheatgrowers throughout the whole width

of the Commonwealth. The yield per acre has naturally claimed our chief attention in the past, and will always be the main consideration, no doubt; yet it may be well for us to pay greater attention to the quality of our wheat. Is anything wrong with the quality? Have there been any complaints? What do our customers say? For we cannot afford to disregard them. Let us look at the evidence given before the Wheat Commission. We are not now concerned with the main purpose of that Commission, that of the marketing of wheat, but with evidence given almost incidentally, but which, to my mind, is of more practical value. Mr. John Darling, merchant and miller, said in April, 1908, 'During the last seven years our wheat, from a miller's point of view, has been on the down grade; this year I am pleased to say there is a recovery. I do not say South Australian wheat is the best in the world. Manitoban and Russian Red Winter are superior to ours; but as far as white wheats are concerned, South Australian wheat holds a position equal to any in the world.' The late Mr. Tom Price, while Premier, visited England, and he said a leading English miller, Mr. Vernon, told him that South Australian wheat was deficient in flour strength, excellent in every other respect, and cleaner than other wheats in the market. This was confirmed by the foreman of the Technical Schools in Birmingham, where bakery classes were held, and by the co-operative wholesale people. Mr. H. E. Davey said, 'I think the quality of wheat has been lessened by hardening the wheats against rust and getting a coarser wheat.' Mr. S. J. Jones, Port Pirie representative of the Adelaide Milling Company, stated, 'New wheats are not as good as the old. You cannot touch the old Purple Straw and White Lammas. The flour is weaker now.' 'You think that is due to superphosphates and not to the different sorts of wheat?' 'Yes.' Major A. E. M. Norton, Trade Commissioner for South Australia, in London, said that Mr. Nicholls, chairman of directors of a large milling firm in Bristol and Cardiff, told him what was wanted in South Australian wheat—and in Australian wheats generally—was flour strength. 'If you wish us to buy your wheats grow those that will suit our trade.' Mr. John Jackett, miller, said a wheat operator on Mark Lane for 40 years told him, 'You South Australians do not grow the wheat that you used to grow.' Mr. Jackett replied, 'Well, I am under the same impression; the milling quality is by no means as good as it was with the wheats grown 25 years ago. Marshall's No. 3 is not a good milling wheat.' I consider the report sent by the Trade Commissioner quite correct. On the other side, however, I glean the following evidence given before the Wheat Commission. Mr. E. J. Birbeck, baker, of Broken Hill, believed 'Our flours were never better than they are to-day.' 'South Australian wheat samples,' said F. B. Guthrie, chemist to Department Agriculture, New South Wales, 'undoubtedly contain the highest average of excellence as milling wheats. In strength and gluten they are above the New South Wales wheats, and in color just as good. The f.a.q. sample is the best milling

sample of any of the States.' C. H. T. Connor, manager of the Adelaide Milling Company said, 'I think the peculiarities of the climate make South Australian wheat the best in the world as a straight flour wheat.' Mr. Hy. Thomas, of Messrs. Thomas & Co., millers, Port Adelaide, stated, 'We are producing the finest flour in Australia.' And Mr. C. H. Johnson, of Messrs. Harrison & Co., millers, Port, believed 'South Australian flour holds the premier position wherever it has gone in the East.' But I have no such favorable opinions from outside Australia. In considering quality in wheat, three things claim our attention. First the gluten content, secondly the strength, and thirdly the color. The color is largely a matter of sentiment, though, of course, if our customers demand it, we must supply it. Our wheats, however, produce flour of good color. The strength, or water-absorbing power, is more important. This is not merely a matter of the baker selling us water as bread at three halfpence a pound. While 200lbs. of ordinary flour will produce 280lbs. of bread, 200lbs. of a strong Manitoban flour will make 318lbs., or 19 2-lb. loaves more. The glutes absorbing the most water give the most elastic dough; the loaf made therefrom becomes more aerated, more palatable and digestible. The English miller wants the strong wheat to blend with the softer varieties, partly home-grown, but mainly from all the wheat-growing countries of the world. He needs to blend, for he cannot depend on getting straight floured wheats, such as ours, which we have seen can be milled fit for the baker without any mixing. But whether it will pay us to cater for this demand for stronger wheats is open to question. The gluten or nutritive value of the wheat is, in my opinion, far the most important point. In a letter received a few weeks back from an English miller, who assisted Dr. Hamil in his recent report on the purity of English flour, he writes: 'The great drawback of all the Australian wheats imported into this country at present is the absence of sufficient gluten.' He sent me a typical sample of what the modern English miller required. Mr. F. E. Lee, Field Superintendent, Department of Agriculture, Victoria, said to the Wheat Commission: 'The gluten content is liable to go up and down according to the character of the soil, the amount of nitrogen it contains,' &c. Hugh Pye, Principal Dookie Agricultural College, Victoria, has said, 'The nation that is fed on a wheat containing a higher percentage of gluten, provided that it is palatable and digestible, will make a people of higher mental and physical standard than one fed on a poorer quality.' Mr. John Jackett remarked that, 'Since the new varieties have been introduced growers have overlooked essential properties of the wheat, such as the gluten.'

"Professor Angus, recognising the importance of this matter of quality in our wheat, advocated the milling of wheats exhibited at the Royal Show in Adelaide. He, together with Mr. Richardson, arranged a test with Messrs. Thomas & Co., of Port Adelaide, to mill 40 bags each of Federation, Marshall's No. 3, Comeback, and Tarragon. The Tarragon and 37 bags of Come-

back were grown on my farm at Saddleworth. The Agricultural Chemist to the Department of Agriculture of New South Wales (Mr. F. B. Guthrie), and the Government Analyst in South Australia (Mr. W. A. Hargreaves) conducted independent analyses, and a baking test was also conducted. The gluten in Tarragon from four tests averaged 11.45, Federation 9.5, Comeback 10.1, and Marshall's No. 3 8.01. The bakers, Messrs. Condell & Collins, reported that Tarragon was the best all-round flour, Federation and Comeback were good working flours, the former good in color and the latter exceptionally strong, but Marshall's No. 3 was soft and flabby in dough and not suited for baking by itself. Mr. Eldridge reported that 'the ringer' bread from Tarragon was best of all, having fair color, good texture, and made a fine bulky loaf. Mr. Kinnaird considered Federation and Tarragon the best commercial flours; Comeback was decidedly the strongest, but only good for blending; Marshall's No. 3 needs color and strength. Mr. F. A. Neumann, the Saddleworth miller, said, 'John Brown and Tarragon were the best wheats he had milled.'

"Among wheats recommended by the New South Wales Department of Agriculture, three are named as strong white, viz., 'Bobs,' 'Comeback,' and 'Jonathan'; as strong—'Bunyip' and 'Cedar'; and medium strong—'Bayah,' 'Federation,' 'John Brown,' 'Marshall's No. 3,' and 'Yandilla King,' besides others practically unknown here at present.

"From my experience with the above I can recommend 'Bunyip' as a good early wheat, earlier than Steinwedel, and useful in that it may be sown late. It should not be sown early, and yet it is about the first to ripen. Of course, we do not expect such a wheat to stool very well; but it is free from many of the failings of early wheats and is a good milling wheat. 'Comeback' is a medium early wheat, containing both Indian and Fife blood, and has a great reputation for milling strength; but I find the yield unsatisfactory, although last season it did better than ever with me, yielding over 24 bush. per acre. The grain was very small, but possibly selection will improve it in this respect and so increase its yield.

"'Bobs' has been termed 'Farrer's Triumph.' The late Mr. Farrer obtained this cross, or rather hybrid, wheat by mating an Indian Bald Skinless Barley with a strain of Blount's Lambrigg. He told me he had no difficulty in fixing the type. It is a medium early wheat of exceptionally good milling quality, and described by Major Norton, our Trade Commissioner in London, as the best wheat in the world from a milling standpoint. Unfortunately, with us it does not yield well, and two seasons ago was very badly attacked by flag smut. Its tendency to shake out has not been so noticeable during the last three seasons, but the yield has been poor. I cannot advise this wheat as a main crop wheat.

"'Federation' needs no words from me. Excepting at Roseworthy, and I suppose in similar soils to that at the College Farm, 'Federation'

has proved itself a reliable cropper almost anywhere and with any season. In the Upper Gilbert Valley last season it easily lead. One wheatbuyer told me that nearly nine-tenths of the wheat grown around Saddleworth this season was 'Federation.' John Darling told the Wheat Commission that wheat from Saddleworth was worth $\frac{1}{2}$ d. more than northern wheat grown round Black Rock, so the milling quality must be good. In a report by Major Norton to the Government upon some wheats sent to England for special milling and testing, one Bristol miller is stated to have said he would pay more for a shipment of Federation than for a cargo of ordinary f.a.q. wheat.

" 'John Brown' is an excellent milling and flour wheat. One of our local bakers told me he made several more loaves from a bag of 'John Brown' than from an equal weight of ordinary flour. I wish we could better the yield of this wheat, which is also a nice hay wheat, and reaps and cleans easily. Unfortunately there are too many sterile spikelets at the base of the head, often as many as five or six, or, say, one-quarter of the head in some cases being sterile.

" 'Tarragon' is a favorite of mine. It is a little unreliable in yield. The last six crops have yielded 27bush., 41bush., 22bush., 31bush., 26bush., and 20bush. per acre. This season it was sown too late, and the dry spring weather dried it off, and I did not expect it to yield 20bush. With a cool spring this wheat, in the cooler districts, is well worth a trial. At Bordertown, last season, it did very well. 'Tarragon' flour is excellent and as rich in gluten content as any I have grown. It stools well and naturally is rather late. It grows tall and may shake a little, as it did this season, with rough hot winds.

" 'Jonathan' has plenty of quality and may suit some districts, but I cannot get a yield from it. When well grown it has a most attractive head with heavy grain.

" All the above-mentioned wheats are Farrer's introductions, and no man has done more than the late Mr. Farrer to introduce and raise wheats of good milling and rust and bunt resisting qualities.

" Of our South Australian wheats, such varieties as Dart's Imperial, Yandilla King, King's Early, Baroota Wonder, and Golden Drop are well known.

" Among hay wheats I favor King's Early, John Brown, and Baroota Wonder.

" In conclusion, I would suggest the trying of some new varieties, on a small scale at first, and if at all promising, select the best heads from the finest plants, and by this means you will, I feel certain, increase the yield as well as the quality of your wheat crop, and so help to enhance the good reputation we still hold for our wheat."

THE DISCUSSION.

Professor Lowrie, congratulated Mr. Coleman on his paper. It contained some very valuable information, but there were some matters referred to which he was inclined to question. However, there was room for a difference of opinion. Mr. Coleman had quoted Mr. Darling to the effect that the wheat grown around Saddleworth was better than wheat grown around Black Rock. It was characteristic of dry parts of the country the world over, that the wheats grown thereon had a higher percentage of proteid and a lower percentage of moisture than those grown on the damper parts. He questioned the accuracy of Mr. Darling's judgment in the matter. It might be that the northern men were growing a class of wheat that if grown at Saddleworth would still be lower in moisture percentage than that grown there. But, so far as growing the same variety of wheat in the two areas was concerned, he had no doubt whatever that the drier the area on which wheat was grown the higher the feeding value. On the general question that it was desirable for the farmer to aim, so far as possible, in the direction of producing strong wheats, this was readily granted. At the same time, buyers in Europe, when they looked at Australian wheat, were not looking for a strong wheat, but for a wheat that would give color and stiffness; and the demand for our wheat depended to a very great degree on the fact that it was so suitable for blending with the home wheats and wheats from other countries. The characteristic of countries where a strong wheat was grown was that they had a very rapid ripening season. This was possibly the explanation of the high gluten content of these hard wheats.

Mr. J. E. Nicholls (Narriady) had grown Federation wheat for the past five or six years. The first crop yielded 20bush. to the acre when the average yield was about 15bush. or 16bush., but it showed such a susceptibility to disease that he was somewhat afraid of it. The following year he only sowed 20 acres, and this yielded 27bush. to the acre when the average was 20bush. Last year the early wheats such as Carmichael's Eclipse, Gluyas, and King's Early were going 25bush. to 26bush. to the acre, but the Federation only yielded about 16bush. or 18bush. In the Narriady district the farmers had practically decided to give it over.

Mr. E. K. Collins (Mount Bryan) appreciated the value of the paper read by Mr. Coleman. He agreed with the remarks made by Mr. Nicholls with regard to Federation wheat. It was being discarded in his district. They were going in extensively for Leather Head, Bunyip, and King's Red.

Mr. M. Walsh (Whyte-Yarcowie) said farmers generally owed a debt of gratitude to Mr. Coleman for the experiments he had conducted during the past few years. Some 30 years ago, White Lammas was a favorite wheat amongst the farmers. It was grown very extensively for a while, but finally it went out of favor. The same had been the case with many other varieties. For three or four years they would yield well, and then they would gradually

degenerate. The grain and the yield both became smaller. He came to the conclusion that growing wheat year after year—the same variety on the same land—had a degenerating effect. He attributed the failure of Federation to this fact. A change of seed was necessary.

Mr. Coleman, in reply, said he had been a little surprised at the remarks of Mr. Darling, but a great deal of the wheat that was sent from Saddleworth was not grown there; it was collected from the drier districts. With reference to Federation, he had not changed his seed since 1901, and so far as he could see there was no deterioration. He hoped that farmers would try some of the newer wheats and by selection endeavor to raise seed suitable to the conditions experienced in their respective districts.

POULTRY DISEASES AND PARASITES.

¶ The Poultry Expert (Mr. D. F. Laurie), in a practical and interesting address, said a great deal of the troubles experienced with poultry could be easily prevented. Perhaps there was no more universal pest than tick, and yet this was easily got rid of. Of late years, with good seasons and heavy crops, farmers were beginning to look on the profits from the poultry as not being worthy of attention, and they consequently neglected their fowls. Where tick was prevalent very little good would be done with the fowls. The pest, as a rule, weakened the bird by sucking its blood and thus laid it open to any other disease. The tick themselves were infested by parasites, and when they bit the fowls they very frequently left one of these smaller parasites in the body of the bird, and the result was what was known as "tick fever." A great part of the North was reeking with tick, which would have to be got rid of before any good could be done with poultry. Kerosine was a most effective means of destroying the tick, as they breathed through spiracles underneath their bodies, and anything of an oily nature would cause an accumulation of dust underneath their bodies, which blocked up their breathing passages. Petroleum served the same purpose. More care should be given to the poultry houses. The average house provided ideal harbors for the pest. Galvanized iron made the very best type of poultry house, and it was not very expensive. A very prevalent trouble in the poultry yard was diarrhoea, which was due to carelessness in the matter of the drinking water. A fowl would not live on bad water that has lain out in a dirty vessel and which became the breeding-ground of bacteria. Drinking water should be kept in clean vessels and in the shade. A solution of 2 per cent. or 3 per cent. of bluestone was the best thing to use to clean out the vessels. Permanganate of potash was a very good oxidising agent, but its action was only transitory. It prevented the growth of the bacteria in the water, but would not kill them. Most bowel troubles were due to specific organisms, and the most effective treatment was to keep the water absolutely clean and medicate it daily. Roup was a name which covered quite a group of diseases

which were of different origin. The most common was diphtheria; but no trouble should be experienced with this if good houses and clean drinking water were provided. A source of trouble was the feeding of musty wheat to the fowls. On no account should this be done. With regard to diseases in turkeys, right throughout the world trouble was experienced with what was known as "blackhead." The only preventive was absolute cleanliness. Immediately a bird became affected it was necessary to isolate it, as if the disease got a hold on the farm it would be impossible to rear turkeys there.

Besides the tick there were other parasites which attacked fowls. Hen lice could be got rid of by an application of kerosine wash. The most efficacious treatment for vermin which lived on the fowls was to dip the birds in a sheep dip such as "Cooper's." The method of procedure was to take the fowl by the legs and beak and dip it thoroughly, preferably about noon on a fine day. Trouble was often occasioned by the birds becoming cropbound. The operation of opening the crop was a simple one. A clean sharp knife should be procured, and if no antiseptic was available, it should be dipped in boiling water. An incision 2in. long should be made and the contents of the crop emptied with the aid of a spoon. When empty, the crop should be washed out with solution of bicarbonate of soda. After being carefully stitched, the wound would be healed in two or three days.

As a general rule, drugs should not be administered to fowls. Diseased stock was not worth breeding from and should not be kept.

MARKETING FARMERS' CLIPS.

Mr. Henshaw Jackson (Wool Instructor) in an instructive and interesting address, said that, having produced the wool, the grower was faced with the problem of the best means of marketing his produce. The term "woolclassing" covered what he had to say in regard to the preparation of the wool for the sale, but unfortunately the average grower paid scant attention to the classing of his wool. There were many processes of making up wool, but they could be divided into two classes, viz., those connected with the worsted trade and those of the woollen industry. In the old days the wool was classed as either long or short. If it was long it was used for worsted manufacture, and if short for the woollen manufacture. At the present time, with so much Merino wool which was suited for both branches of the industry, it was necessary to find some other basis on which to divide the wool, so as to get the right sorts to the right quarters. - This basis was arrived at by taking the way in which the buyer made his calculations as to the price he would pay for the wool. He worked entirely from the standpoint of the quantity of clean scoured wool, ready for the first process of manufacture, which he could get from the clip. When classing, the heavy wool should be separated from the light. Generally it would be found that the lighter wool would return a higher price than the heavier. If the whole clip had been

baled together it would be found that it would have sold on the basis of the value of the heaviest wool in the bales. It was only necessary to understand the conditions governing the prices. The question to be considered from the growers' point of view was the return per head from the sheep. While the buyer would not pay for yolk, he liked to see a healthy flow of it. On farms where sheep have been continually bred the clip would generally be uniform, and there would not be much need to go in for quality classing. This would not pay the farmer with a small clip. All that was necessary was to match the wool. The bright, light fleeces should be put together and likewise the dull and heavy ones. Before classing the clip it was necessary to skirt. This consisted of taking off the fleeces those portions which had been depreciated in value by bur, seeds, and dags, and sweaty edges. If the skirting was carelessly done, the buyer, when feeling the wool, might place his hand upon the daggy pieces or sweaty edges. He would be uncertain as to the amount of useless weight in the lot, and to make full allowance he would naturally lower his estimate.

CO-OPERATIVE CLASSING.

The small flock owner did not to-day get the return for his wool that the large grower of wool did. One of the chief reasons for this was that he was unable to market his product in big lines. But this could be got over by a system of co-operative classing. All that was necessary was to secure some central depôt in which to receive and class the wool, and a reliable man to do the work. The clip of each owner would be taken in, and he would be given a receipt for the gross weight. The wool would be sorted into various grades, and each grower credited with the amount of each grade which he had delivered. The whole clip from the district could in this way be marketed in one line. But it was necessary that the grower should get out of his head that he grew the best wool in the district. The fact must not be lost sight of that the man who grew the best wool also grew some inferior stuff. The result of this co-operation should be a gain of at least 1d. per pound, which was considerable, even if the extra cost amounted to $\frac{1}{2}$ d. per pound. The educational side, also, should not be lost sight of. The person who grew the best wool soon became known, and his example would result in a raising of the standards, and an increase of the returns to the grower.

Afternoon Session.

BARLEY-GROWING.

Professor A. J. Perkins (Principal, Agricultural College, Roseworthy) delivered an address in which he said there were many farms in the State, at least in the Lower North, on which six-row barley should prove a profitable

crop, in some instances even more profitable than wheat. Most farmers were inclined to regard this barley—which was generally known as Cape barley—as a fodder exclusively; but in that relation the objection was often raised that there was no market for it. True, feeding barleys were in strong demand only when the pig market was good, which was not the case at present. There were other purposes, however, for which they were used when the grain was plump and well grown. As a rule the two-row, or English, barleys were looked upon as the proper malting barleys, but actually the maltsters employed the Cape as much as the two-row kinds. Some years ago a big maltster in Adelaide told him that they had been compelled to import quantities of six-row barley from France for malting, because the sample obtainable in South Australia was not satisfactory. Six-row barleys were produced extensively in the Mediterranean districts, sometimes more than wheat, and the bulk of the supplies were forwarded to England for malting purposes. At the Brewers' Exhibition in London not long ago the highest award went to a sample of six-row barley which had been grown in Asia Minor. He was satisfied that if a sufficient quantity of a suitable type and character could be raised in the Central State it would easily find a market on the other side of the world. The six-row barleys were better adapted to a warm, dry climate than the two-row, and would resist drought more effectively than wheat, because, in a large measure, the growing period was much shorter. In two years' experience he had found it to be from 15 to 20 days shorter than that of King's Early. The only cereal crop which could be grown at Alexandria, Egypt, without irrigation was the six-row barley. In the 8-10in. rainfall districts of Tunis three times as much barley as wheat was raised. During the last seven or eight years several varieties of six-row barleys had been grown at Roseworthy, and two yielded exceptionally fine grain, which was much admired and sought after by the buyers. When growing six-row barley there was no need for the crop to be preceded by bare fallow. The practice at Roseworthy was to put the barley in on the wheat or hay stubble in the course of the following four years' rotation—bare fallow, wheat, barley, grazing. That meant two cereal crops and only one period of bare fallow in the four years. Last season a 40-acre plot of barley, which had been preceded by a hay crop and bare fallow the year before, had given a return of 45bush. to the acre, although the rainfall in the growing term—April to November—was only 8.00in. Further, the sample was exceedingly good. He was convinced that a comparison of the four-year rotation, including the barley, with the ordinary rotation in which bare fallow occurred twice in four years, would result in favor of the former so far as the profits were concerned. It was not advisable to put barley in after bare fallow, as the product would be too rank, though the quantity might be heavier. There was another advantage of associating barley with wheat. Barley could be sown much later than wheat, consequently the seeding period was extended.

If it was desired to utilise the crops for feeding off, the barley could be sown as early as they liked, even before rain fell. The cost of tillage when wheat was the only cereal grown was considerably higher than when barley was included. One ploughing, followed by a rolling and a scarifying, was all that was necessary prior to seeding. He did not think there was another cereal crop less liable to be detrimentally affected by weeds than barley. Farmers were prone to say that barley dirtied their land, and got among the wheat crops. He could not understand that, because, notwithstanding that they had been growing about 150 acres of barley every year for a number of years at Roseworthy, seldom had any barley heads appeared among the wheat. Another objection raised against the cultivation of barley was its liability to smut, and the extreme difficulty experienced in successfully pickling it. They had had smut at Roseworthy, but not since they had been using hand-selected seed. It was possible to pickle by means of the hot water system with fairly satisfactory results, but there was always the danger of destroying the germinating power of the seed through having the water too hot. Bluestone as a pickle was of little, if any, service. The best plan, however, was to secure thoroughly clean seed from crops which had not been affected by smut. The growth of green feed which resulted from the seed shed by the barley plants was greater than that from any other cereal. He was surprised that barley had not been grown more extensively in districts similar to that in which the College was situated; but he believed, from the inquiries which had been made recently, that it would receive much more attention in the near future.

QUESTIONS.

The Hon. T. Pascoe (Minister of Agriculture) asked whether barley was likely to be successful on high land where frosts were troublesome?

Professor Perkins replied that barley was more liable than wheat to succumb to the effects of frosts. As a rule it was necessary to sow before the frosts were heavy enough to affect the plant in its early stages.

Mr. A. M. Dawkins (Advisory Board) had grown barley on light soil, and secured a return of 50bush., which he sold at 3s. 2d. per bushel. The following year he sowed the barley on red stiff clay, and it was not worth reaping. The soil required for this crop was a light sand, or light loam.

Mr. J. E. Nicholls (Narridy) asked for an expression of opinion from Professor Perkins as to the value of pickling barley for the purpose of preventing smut.

Professor Perkins replied that the general practice was to use bluestone, but it was admittedly ineffective. The smut germs were very often underneath the husks of barley, and the hot water test was the only one of value. The high temperature penetrated the grain and killed the smut germ. The test was difficult to apply, as if the water was too hot the germination of the seed would be affected. Bluestone was better than fungisine for pickling.

EARLY OR LATE SOWING OF WHEAT.

Mr. E. J. Eagle (Port Pirie) read the following paper :—" For this district I consider Gluyas to be the standard variety of wheat at present, because it is hardy, early, and yields fairly well. The best way to sow is to drill the seed in with super. on well-worked fallow where there is a good tilth. If the winter rains continue and the spring is late the late sown seed will most likely do better, as the straw yield will not be so heavy, and the plant will throw more of its energy into wheat production. An early spring and summer would have a disastrous effect on late-sown wheat. There are but two, or at most three, weeks of any seed time during which it is possible to sow wheat to reap the best returns. The difficulty is to hit on those weeks. We have men like Giddings, and others, who tell us what the season will be like week by week all through the year, which is just what we need for successful farming; but there is a possibility of the compilers allowing an error to creep into their calculations, so that when an inch of rain due on the 10th of September does not fall until the 1st of October the wheat plant is likely to curl up its leaves and cause the farmers' vision of a bountiful harvest to pass away. We work more by the real facts of past experience, and this experience, especially that of the last few years, tends to show that we should not begin sowing until the season has fairly opened. It is advisable to wait until there is a good fall of rain before sowing, so that the weeds may germinate and the land be in good working order. I like a dry surface, with the ground moist enough to start the grain, which, in some land, will do better if it has a few days to grow before rain falls. Before the days of super. the early wheat had the advantage, because it grew on through the winter and was ready for the spring, but now it is better to use early-maturing wheats and sow a little later. Some sow late wheats early and early wheats late, but this does not meet the case, as later in the year it puts all the wheat in the same stage at a critical time in its growth, so that should a dry spell occur in the spring (especially if the winter has been favorable to a heavy growth), with two or three hot winds, all your wheat is in the same stage of development. This would not happen if you were sowing an early wheat only. Then again you have trouble in the harvest time. You cannot begin reaping until almost the whole of your crop is ripe. By giving a good dressing of super. to the later sown seed it will grow on through the winter, be freer from weeds, have less straw to trouble the reaper, and have a chance of yielding satisfactorily, unless the spring is too severe. For hay, early sowing with early wheat is likely to give the heaviest returns. The plant has more time in which to make growth of straw, and, being early, the wild oats and other plants are cut before the seed is shaken. The idea is to get land so that when the time for seeding has arrived we can go ahead with the least possible delay. For this reason if a motor suitable for farm work could be obtained, so that work could be done in half the time, the increase

in yield might soon pay for it. As we have noticed, the time for sowing is short, and as much depends upon the year as to when this time is, it would seem as if our work depended on luck; and perhaps there is a good deal of luck in farming. Yet agricultural science is making good progress, and if it cannot tell us what the spring will be like, it teaches us to be ready for emergencies in the form of dry spells by making the most of what we have by placing our soil in the best condition both for absorbing and retaining moisture. The irregularity of the seasons also increases our difficulties. Scarcely any two seasons open alike, either in time or manner, which makes it necessary for us to form our plans from year to year; and when we come to the time of harvest we have the privilege of looking back and plainly seeing our mistakes. In summing up the evidence brought before us, it seems to me that the farmer had better strike the happy medium—not be in too great a hurry to start, nor so late as to cause his work to unduly drag.”

DISCUSSION.

Mr. F. Coleman (Saddleworth) stated that, so far as sowing late wheats early and early wheats late was concerned, he did not think the early wheat would mature earlier. With many wheats of this nature it was unwise to sow early, on account of the risk from frosts. As a general rule early wheats should be sown rather late.

Mr. J. J. Kelly (Narriidy) believed in sowing early wheats early, provided there was no rain. When the rain was late, later varieties of wheat should be sown late.

Mr. A. M. Dawkins (Advisory Board) stated that in his district (Gawler River) the late-maturing wheats were sown first, then the early-maturing varieties, and following these the barley. It was better to sow after rain, but to be a little early with the sowing was preferable to being somewhat late. He found that wheats such as King's Early or Steinwedel sown during the last week in May would be ready a week before a wheat like Tuscan, sown during the first week in April.

ADMINISTRATION OF MEDICINE TO DOMESTIC ANIMALS.

The Assistant Government Veterinary Surgeon (Mr. C. E. Loxton, M.C.V.S.) gave an interesting demonstration of the means of administering medicines to domestic animals; a horse being used for the purpose. Considerable interest was evinced in the proceedings. A number of questions were answered, and advice tendered on matters appertaining to stock generally.

Evening Session.

EXPERIMENTS AND SYSTEMATIC RECORDS.

PROFESSOR LOWRIE, M.A., B.Sc. (Director of Agriculture), in an address more especially directed to the young farmers, said every farm had to be worked according to the specific conditions met with on it. The subsoil

was a very important feature in relation to fertility. Two soils might, on analysis, be found to be very similar to a depth of say six or eight inches, but the fertility of the soils might differ greatly if the subsoils were of a different nature. A porous land of any depth, through which the water would drain, but with a good soil on top, was very much handicapped compared with a land of exactly similar nature on top, but with a more retentive subsoil. These were conditions that could only be properly gauged by the man working the farm; and it was for that reason that he urged the younger farmers to keep a note of the conditions met with, setting out the date on which the cultivation was done, the kind of cultivation, the treatment, and the results. The older farmers very likely held very strong opinions; but their opinions would not be so strong if they had before them a statement setting out the points above mentioned. They were very often carried away by a strong impression that came from the experience of two or three seasons, but to which they attached too much importance.

Coming down in the train from Petersburg he had noticed that there was a much larger percentage of horned stock in the paddocks than there was of sheep. He did not think the grazing of horned stock would return anything like the profit that would be secured from sheep. A subject round which there had been considerable controversy was the time of the year at which to begin working the fallow. If year after year farmers would note the returns per acre from the land that they fallowed in June, and compared the results with those from land which they fallowed in late August or September, it would very nearly convince them that it would pay to procure an extra team in order to get the fallowing done in good time. It was also necessary for the benefit of the next year's crop to get on to the fallow as early as possible, and so gather the moisture and get it down into the land. Another important question which the farmer should have in black and white was the depth to which he had ploughed his land. Some farmers favored shallow ploughing, others favored deep—and to some extent the truth was with them both. It was for the individual to find out the depth of ploughing to which his land best responded.

A controversial point also was the quantity of seed per acre that was to be sown. The general tendency was to lessen the quantity as one got into the drier districts. Where the available quantity of moisture was small a light seeding was necessary. At Roseworthy he had sown 55lbs. to the acre, but that was slightly heavy. If the crop was for hay, a much thicker sowing could be given.

MORE MANURE.

There was no question at all as to the necessity of using phosphate, but there was some difference of opinion as to the quantity that could be applied with most profit. In a rainfall such as obtained in that district, he would give a much heavier dressing than was given by the average farmer. In

addition to the yield of wheat the carrying capacity of the paddocks was to be taken into consideration. The very least that should be put into the land was as much as the crop was likely to take out. If it should be found that the greater dressings caused the tops of the wheat plants to burn, it would be advisable to apply a portion of the manure earlier in the season and harrow it under. The heavier applications would result in a better growth of herbage after the crop, and increase the organic content of the soil. Another point on which it would undoubtedly pay to obtain accurate knowledge was the draught of different classes of farming implements and machinery. At present they knew very little about that important matter. It was his intention to recommend to the Minister the purchase of a dynamometer for the purpose indicated, and to let it out to the farmers. In passing he wished to pay a tribute to the remarkable adaptability which the implement manufacturers had displayed in meeting the requirements of the men on the land. There was one appliance, however, to which he was strongly opposed. That was the complete harvester. If that machine should be in general use 20 years hence he would be greatly surprised and keenly disappointed. Why should horses be called upon to haul heavy contrivances when an infinitely lighter stripper might be used, and, by means of a petrol or oil engine and a winnower, a much better sample of grain produced?

Through the gradual replacement of the stripper by the complete harvester, the f.a.q. sample had suffered materially.

DISCUSSION.

The Minister of Agriculture said the Director was right in advising them to experiment more. A few of the farmers in South Australia had made themselves famous by experimenting. The name of Marshall was known all over Australia because one Mr. Marshall had stepped out of the groove and bred and selected wheat which had been grown to the advantage of all. Another name equally well known was that of Mr. Carmichael, the discoverer of Carmichael's Eclipse. It was said that fully 70 per cent. of the wheat grown in the Crystal Brook district was of that splendid and profitable variety. Still another good farmer and benefactor to his fellows was Mr. F. Coleman, of Saddleworth, who was steadily building up a reputation.

FREE PARLIAMENT.

NEXT CONFERENCE.

After considerable discussion, on the casting vote of the Chairman, it was decided to hold the next conference at Saddleworth.

THE VISITORS ENTERTAINED.

At the close of the evening session the local Branch entertained the Departmental Officers and visiting delegates at a banquet in a room attached to the Institute.

South-Eastern Branches.

Conference at Kingston.

The Annual Conference of South-Eastern Branches of the Agricultural Bureau was held at Kingston on Thursday, March 28th. The representatives of the Department of Agriculture present were—Professor Perkins (Principal Agricultural College, Roseworthy), and Messrs. J. F. McEachran, M.R.C.V.S. (Government Veterinary Surgeon), W. J. Colebatch, M.R.C.V.S., B.Sc. (Superintendent of Agriculture in South-East), Henshaw Jackson (Wool Instructor), G. R. Laffer (Member Advisory Board), and G. G. Nicholls (Secretary Advisory Board). The undermentioned gentlemen representing the following Branches :—Kingston—E. Goode, R. Lloyd, W. England, H. D. Flint, E. P. Coe, V. Clark, G. Dent, J. Wilson, C. Barnett; Naracoorte—W. Loller, E. Coe, S. H. Schinckler; Millicent—J. Bowering; Lucindale—W. M. Secker; Penola—J. T. Williams, D. McKay, R. A. Maxwell, D. A. Fullarton; Kalangadoo—D. W. Tucker, and a number of visitors were also present.

OPENING ADDRESS.

Mr. G. R. Laffer (Advisory Board), in declaring the Conference open, said it gave him great pleasure to be present. It was gratifying to see the interest taken in the Agricultural Bureau in the district, and he was hopeful that an interesting and profitable meeting would be held. He regretted that other members of the board were unable to be present, but business arrangements had prevented those who otherwise would have been present from attending.

IMPROVING WHEAT BY SELECTION.

The following paper was contributed by Mr. S. H. Schinckel (Naracoorte Branch) :—"If we look into the history of the methods adopted by the leading sheepowners of this, or any other State, we will find that when they first thought of improving their flock they paid special attention to selecting the best from which to breed. This has not only proved to be good business for themselves, but many others have been able to participate in the benefits. The same applies to cattle, horses, &c. If the sheep, horses, cattle, &c., can be improved by careful selection, why should not wheat or other cereals. It is very difficult to say to what extent the production

of wheat would be increased in South Australia by the careful selection of all the seed sown. Assuming, however, that it was possible to increase the average by only 1 bush. per acre, this would represent an enormous value. The area under wheat during the past five years (not including the year 1911-12), was 1,826,817 acres. The value of the additional bushel at 3s. per bushel would be £274,022. Surely that should be sufficient to make farmers think of this question. Further, is it not possible that, by the careful selection of all seed wheat our wheat standard may be considerably raised? In trying to improve wheat by hand selection it is necessary that you should know the variety you wish to improve when you see it. Take any convenient receptacle and carefully walk through the field when your wheat is ripe, picking only the best heads to be found, say, enough to yield 1 lb. of wheat. This 1 lb. of wheat can be hand-threshed, and then hand-picked, to take out small grains should any be found. It should be sown on a narrow strip of land which had been previously well prepared, somewhere in the centre of the wheat field. If sown on the outside, or in a garden, sparrows or other birds may rob you of a good deal of grain. When this small plot is nearly ripe, inferior heads, such as heads tapering too much at the top or at the bottom, should be pinched off and thrown away. It is almost certain that some faulty heads or plants will be found, and if the grader only is used the smaller grains from the inferior heads or plants only will be removed, and the plumper grains from the centre of inferior heads would be left. Therefore, picking out the inferior heads or plants from the first and second plots must improve the wheat. This small plot of wheat should be carefully reaped and thoroughly cleaned, and should give, say, 10 lbs. of good clean seed. This can be sown through the drill, preferably on a long narrow strip, for the same reason as stated above, somewhere in the centre of the field, on well-prepared land. When ready, again look for inferior heads or plants, harvest and thoroughly clean. This should give a return of, say, 2 bush. Sow these 2 bush. on well-prepared land, and the return should be about 20 bush. to 25 bush. This should again be thoroughly cleaned and sown on well-prepared land, and when harvested should give a return of 100 bags or more of first-class sample of pure, clean seed wheat, which would surely find ready purchasers at remunerative prices. By starting a selected plot with only 1 lb. of seed, with good care it only takes five fair average years to get a return of 100 bags or more. It is not, however, sufficient to be content with 100 bags of seed. A large quantity such as this cannot very well be kept thoroughly clean from other varieties of wheats if they are grown on the same farm. Therefore, it is necessary that a small plot should be started nearly every year; but preferably every year, to be perfectly sure that one variety of wheat is kept true to name and type. We have some farmers who are paying special attention to this valuable work, and I hope that in the near future we may have many more following their good example."

THE DISCUSSION.

Professor Perkins said that the selection of seed with the idea of improving the yield was good, but he did not think the system Mr. Schinckel had advocated would be quite satisfactory. For a number of years at Roseworthy they had been selecting wheat, but the chief advantage was in that the eighth generation could be traced right back to the original seed. Mr. Schinckel had advocated the picking out of strange heads that occurred in the crops, but this would be found practically impossible. The better scheme was to pick out the heads that were most suitable. The only possible way to secure pure seed was to start from one head of grain, or better still, from one grain. The seed from this grain could be planted, and the following year the best heads should be picked out and sown. This practice continued, would secure a better class of seed, and the yield would consequently be increased. It would be an advantage if this was carried out in every district in the State.

Mr. E. Goode (Kingston) said that the Kingston land at present was too sour to grow wheat, but he believed that this part would be a wheat-producing district when the land was drained. Very fine samples of wheat had been grown here, but one difficulty was that the floods washed the crops out.

Mr. D. Tucker (Kalangadoo) stated that a good deal of interest was taken in wheat-growing in his district, and some very fair yields had been received. For six years he had averaged 30bush. to the acre. With regard to the selection of seed, he would not take the whole of the best heads even. There were generally small grains both at the top and bottom of the heads, and these should be discarded. Every farmer should do his best to improve the yield from the land.

POTATO-GROWING.

Mr. J. Bowering (Millicent) read the following paper :—" As the production of potatoes is increasing in our district, it is wise for us to inquire into the most profitable way of growing this article of food. The best soil for potato-growing is the volcanic, which is easy to work, and returns large crops. Next to this is peat country, with an admixture of sand, or what is known as black sand. Other lands follow in order according to labor expended for the return gained ; and here I would remark that the best quality of potatoes, and those which keep longest when stored, come from the heavier soils. To prepare land so as to get the best return it is necessary to plough it in March or April, or as early as possible in the season, to a depth of from 6in. to 8in., and the oftener it is harrowed the better, weather permitting. The time for planting depends to a considerable extent on the position. The higher land should be planted earlier than the low-lying country. On the higher land August, and on the low land up to the end of October, represents the planting season. The most economical way of planting is that of dropping the tubers while following the plough, which should be set to turn a furrow 4in. deep. This will allow the seed to lay on broken ground, which is far better than

dropping them on a hard bottom. The rows are usually 30in. apart and the sets 24in. ; but I am of opinion that the same number of sets in the row, with an increase of 10in. in the space between the rows, would be an advantage, giving more room for cultivation between the rows while the tubers are growing. There is another method of planting, and I intend experimenting with it this season. It consists in planting the seed 30in. apart, so that the cultivator can be run through the rows each way. This will leave the plant in a rise with cultivation all round it. Cultivation when the crop is growing is essential to success. It is necessary to keep the ground well stirred. The roots require air as well as moisture. The selection of seed is important, and this is a point which is very often overlooked. If small seed is sown you must not expect to dig big potatoes. One always selects the best if he wants to keep up the quality of his flock, or herd, or the standard of his wheat. Neglect of this feature has caused the degeneration of some of the best varieties of potatoes, notably Brown's Rivers, and they are now spoken of as "run out." Others will follow the same track if the culls are planted. Manuring adds materially to the profit from the crop. Farmyard manure is the best that can be used, but will give better results if the manuring is done during the season previous to planting. If the manure is used with the planting, the crop is liable to have rough skins, which makes the tubers look unsightly, and they will not sell so well as smooth-skinned potatoes. Gathering the crop is best done earlier than has been the practice of late years. Everything when it is ripe commences to decay, and the potato is no exception."

THE DISCUSSION.

Mr. R. Lloyd (Kingston) had been able to keep potatoes dug in May and June until the early crop was ready during the following season, say, in November. The land on which the tubers were grown was a dark sandy loam. With regard to the application of manure to potatoes, he found that it caused "scab," whether it was put in with the crop or four or five years previously.

Mr. E. Goode (Kingston) considered the growing of potatoes was going to be of considerable importance in the district in the near future. He did not think that scab was attributable to manuring. For years attempts had been made to grow potatoes here, but the floods caused considerable trouble. However, they now put in the seed between October and December and thus missed the floods. He had grown between 6 tons and 7 tons of potatoes to the acre on land that would not carry one sheep to that area. He would like to know the best way in which to put the manure on.

Mr. D. Tucker (Kalangadoo) said scarcity of water was a favorable condition for the development of scab, and he had found that it was more prevalent in dry seasons. The quality of the land determined the manure required for the growth of potatoes. He had not been successful with stable manure. It was too "heaty," unless the season was very wet. It should be put on at

least three months before the planting was commenced. With reference to artificial manures, he would not run this into the furrow with the potatoes, as he had found they grew too fast and suffered severely if a frost or hot wind was encountered. Potatoes grown on heavy soil would keep better than those grown on lighter soils. He had some of the Snowflake variety in excellent condition which were dug during June of last year. He did not think it advisable to plant tubers without manure; but it was necessary that intending planters should experiment with the idea of ascertaining the dressing that would best meet the requirements of the land.

Mr. G. R. Laffer (Advisory Board) said bone super. was used exclusively in the Hills district. Very heavy yields were secured, but a great deal of trouble was expended on the crops.

Mr. Colebatch, M.R.C.V.S., B.Sc., thought Kybybolite was not a good district for the cultivation of potatoes. One point in connection with the growth of this crop was the improvement of the seed by proper storage in trays during the winter. The increase due to the sprouting of the tubers in the trays would more than repay the extra trouble involved. This should be done in all districts where potatoes were grown, and a larger percentage of tubers would be secured. Farmyard manure was an excellent dressing for ordinary land. In a district like Mount Gambier, where the soil was very often at the bottom, it was necessary to have something to hold the moisture in the land in the late parts of the season. The addition of farmyard manure to the flats in this district would have the effect of sweetening the soil. His experience had been that scab was more troublesome in wet seasons than during others.

PREPARATION OF FARMERS' CLIPS.

Mr. Henshaw Jackson (Wool Instructor) delivered an address, in which he described the best methods of preparing small clips of wool for market. With the aid of a few fleeces he explained the various aspects which were considered by the wool-buyer in taking his estimate of the value of a line of wool, and showed the necessity of carefully skirting the fleeces before marketing. He advocated the co-operative marketing of small clips, which would result in a better price being returned for the wool, and should ultimately mean a general improvement in the standard of farmers' flocks.

Afternoon Session.

NEXT CONFERENCE.

It was decided that the next conference should be held at Penola.

GENERAL CULTIVATION OF THE SOIL.

A paper was read by Mr. W. Loller, of Naracoorte Branch, in which he stated that the light soil of the district in which he was farming needed to be worked

very early. If it was left late and worked when wet it would run together and cake badly. The crop should be got in early, while the land was still warm. If it was left until June or July the germination was very likely to be affected. Humus was required, and this could best be secured by adding to the soil farmyard manure, &c. Not enough attention was paid to fallowing in the South-East. It was said that it did not pay to turn in the grass crops; but this was a mistake. With old and somewhat dirty land it was advisable to start the fallowing just after seeding. A crop of field peas would add considerably to the nitrogenous content of the soil, and the soils generally in the South-East were deficient in nitrogen. If it was too late to put in peas, maize or sorghum could be substituted. Rape was another crop that could be grown with advantage, and it was a first-class sheep fodder. The great advantage of the early fallow was that it enabled the seeding to be commenced early.

PREPARATION OF THE SEED BED.

Mr. D. Adamson (Penola) contributed the following paper:—"Now that harvesting operations have drawn to a close, the most important work on the farm will be the preparation of the land for the coming seeding. This should be taken in hand at once, as it has been proved that most of the soils in this district can be worked to a far greater advantage in the summer and autumn than during the winter months, as much of the land then becomes too boggy for effective working. It is not my intention to deal with the subject of fallowing in this paper, as it is so little practised in the South-East; but, in my opinion, the time is not far distant when some system of either bare or green fallow will have to be adopted, as land which has been cropped for the past few years in succession has become very foul with numerous varieties of weeds, and something must be done to keep these in check. In the north of this State bare fallowing is carried on for two reasons, viz., to conserve moisture and to clean the land; but here in the South-East, where the rainfall is abundant, it is quite probable that a fodder crop such as rape would have quite as beneficial an effect as bare fallow, and would, of course, be more profitable. Just at present the stubble land should be in excellent order for ploughing; but where grass land is to be dealt with it will be necessary to wait for the early rains. For dry ploughing, I consider the disc plough the best implement to use, as the discs will enter the ground more readily than shares, especially if the plough has plenty of weight and is set to cut narrow furrows, a suitable width being about 7 in. Regarding the correct depth to plough, it is impossible to lay down any hard and fast rule, as there may be half a dozen different varieties of soil on one farm, and therefore the farmer must use his own judgment; but I am of the opinion that the bulk of our land receives far too shallow a ploughing, as the favorite depth appears to be about 2½ in., and much of the land would very easily stand a 4-in. ploughing. While speaking of dry ploughing, I will make a few

remarks on the Scotch thistle, which is without doubt the greatest curse with which our farmers have to contend, and it is only by ploughing the land at the present season that it can be effectively dealt with. Owing to the extraordinary manner in which it takes root again, it will be found impossible to kill the thistle if it is turned up while the land is in a moist condition; but if exposed to the sun it will die at once. Of course I do not mean to say that if the land be ploughed dry the crop will be altogether free from thistles; but if the plough has been doing good work, comparatively few will make their appearance and these may be dealt with by the cultivator. It is a very unwise practice to sow a late-maturing wheat on land badly infested with thistles. If an early wheat be sown it will be very often possible to have the crop reaped before the thistles have attained any great height; but if the crop ripens late in the season they will seriously retard harvesting operations. King's Early should be a very suitable wheat for the purpose, as it makes a vigorous growth and is one of the earliest varieties. The fact cannot be overlooked that the bulk of our farmers do not devote sufficient time and attention to the working of the land after it has been ploughed. The practice of a great many is to simply harrow the land and then drill in the seed. This is a great mistake, and I feel sure that if the thorough system of cultivation adopted in other parts of the State were carried out here the yield would be increased enormously. After the land has received a good harrowing, and the weeds have made their appearance, the cultivator should be brought into use. There is a large number of good machines at present on the market, but unfortunately very few of them have been tried in this district. They are of two classes, viz., disc and share. The one-way disc cultivator has been highly praised by many farmers in the mallee districts, and it is claimed that it will cut the bulk of mallee shoots which appear on freshly-burned scrub land. If this is the case, it should prove an ideal implement for dealing with the Scotch thistle. The V-shaped disc implements at present in use in the district are simply harrows, and do excellent work as such; but many farmers make a mistake by expecting them to do the work of the cultivator, for which use they were never intended. My own experience has been chiefly with a broad share stump-jump cultivator, which I find does capital work when the land is in a suitable condition, and if worked at a depth of about 3 in. will cut or pull out the bulk of the thistles and other weeds. I have known instances in this district where farmers have given land which had become particularly foul a second ploughing before seeding, and I believe that they were amply repaid for the extra amount of work. For the purpose of re-ploughing, the mould-board plough is preferable to the disc, as the latter will be found to go in too deeply, and if the land is inclined to be wet and sticky, the discs will not revolve. In conclusion, I would like to point out that it is very foolish for a farmer with a limited number of horses and a small amount of machinery to endeavor to put a large area under crop, as the work

will be only half done, and the return not very profitable ; but if all that work was put into about half the area of land the return would probably be as great as from the whole, and the balance of the land could be utilised for grazing purposes."

DISCUSSION.

Mr. Colebatch, M.R.C.V.S., B.Sc., said the light land mentioned by Mr. Loller in his paper went into a seedbed after the first ploughing, and any subsequent cultivation had the effect of working it into dust. The only method to adopt in this case was to replough it. For this reason he thought it would not pay in the South-East to work the fallows to anything like the extent that they were worked elsewhere. The purpose of fallowing here was not to retain moisture, but to provide a depth of land which would be ready for seeding as soon as favorable rains fell. With the heavy land, the present was about the only time that they could be successfully ploughed. As soon as the rains got on to it the land became tough and greasy, and it was impossible to get the plough into it.

Mr. D. W. Tucker (Kalangadoo) said the best results would not be obtained from the lighter classes of soils by fallowing. They were inclined to bake, and the air and light seemed to be excluded. So far as the heavier soils were concerned, the more they were worked the better. Attempts should be made to destroy the weeds as soon as possible before the rains came. If the land was ploughed in February or March, and three or four hot days occurred, very little trouble should be experienced with the weeds.

Mr. S. H. Shinkel (Naracoorte) said the best method of eradicating the star thistles was to plough the land early with the disc plough, which would cut the roots. The harrows should be used immediately after a fall of rain. This should encourage the germination of the weed seeds in the land, and cultivation would have the effect of destroying these.

CATCH CROPS.

The Superintendent of Agriculture in the South-East (Mr. W. J. Colebatch, M.R.C.V.S., B.Sc.) in an address on the advisableness of cultivating catch crops in the South-East, said he had come to the conclusion that there was no great deal of good average second-class land in this district. There were the two extremes, good, rich, first-class land and some of a poor quality. But with both the chief requirement was some binding material that would give a means of controlling the moisture in relation to the soil. With all the lighter land in the district there was a want of bottom. To secure this the first essential was drainage. He was quite satisfied that the value of the drains at Kybyholite would be much greater than the value of all the fallowing that could be done there. The usual practice was to make a drain about 12in. or 18in. deep, which was quite sufficient. The main concern was to make it sufficiently wide. A very important matter affecting South-Eastern

conditions was to get organic matter into the soil quickly, but with due regard to the expense. Farmyard manure was very good, but, of course, the quantity available was limited. Green manuring was very effective with the lighter lands, and white mustard was a suitable crop for this purpose. It was found that in sandy land white mustard gave better results than legumes. It was necessary to sow this early, because it was not usual to get a rapid growth on the land. March 1st would not be too early. A catch crop was one that was taken off between two main crops; but the term was generally restricted to crops grown after harvest and before seeding. The southern districts were peculiarly suitable for the growth of such crops, so far as the climatic conditions were concerned. The conditions that suited a catch crop were a long, moist summer and a short winter. To some extent the working that the land got in the preparation for the catch crop was part of the preparation for the succeeding crop. The direct return from the catch crop should not be the basis of the judgment of its value. It was grown for the indirect benefits to the soil, and where legumes were cultivated the addition of nitrogen to the soil was an important matter. Another indirect advantage was that the working up of the land was spread over a longer period, and there was not such a rush when the crops were to be got in. This was a most vital point in the South-East. The seeding season was short, because the land was of such a nature that it was not possible to get on it quickly, and when there was any sun it soon became too dry. Anything that would relieve the pressure of work at seeding time was an advantage. The effect of keeping the land covered during autumn and winter was to conserve the nitrogen, for the reason that the plant took up a large quantity of moisture and used the nitrogen in building up its own tissue, and this was made available in the land for the following crop. There were two crops peculiarly suitable for the South-East, one for the southern portion and the other for the northern. In the Mount Gambier district Italian rye grass could be grown with advantage, but this must not be confounded with perennial rye grass. The one was a slow-growing grass, taking about four years to reach maturity, while the other gave its best in the first two seasons. Italian rye grass was palatable to all classes of stock. It would grow on all South-Eastern soils, with the exception perhaps of sand or light sandy loams. It germinated well, and it could be fed long before it was fully grown, and it would come on again very rapidly after it had been fed off. It was highly nutritious and had no bad effect on the stock. If sown by itself it should be put in at the rate of about 4bush. to the acre and put down to a depth of from 1in. to 1½in. It could be grown in the Mount Gambier district after early potatoes. The next best crop was winter barley. This was a quick growing fodder, but it would not stand the cropping that Italian rye grass would. Then there were such crops as winter oats for spring feeding, and Cape oats. These fodders should be sown at the rate of about 3bush. to 4bush. to the acre. With

the lighter lands, where a catch-crop system was made necessary, it would be unwise to depart from common rye. It was necessary to get from 3bush. to 4bush. to the acre in early, with a good dressing of manure. This would give a good bulk to turn under. Peas, tares, and chou moellier were all very suitable fodders for growing as catch crops.

Evening Session.

AILMENTS AND DISEASES OF HORSES.

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) delivered an interesting lecture, illustrated by means of lantern slides.

The lecturer referred to the Government scheme for the examination of stallions for the Government certificate of soundness, and described in detail the various hereditary unsoundnesses—ring bone, side bone, bone spavin, bog spavin, thoroughpin, and curb. He emphasized the importance of breeding from sound stock, and advised stockowners to patronise stallions certified sound, and of the necessary standard as regards breeding, type, and formation.

Foot troubles—quittor, sanderacks, canker, thrush were illustrated, and as the two latter diseases are attributed chiefly to dirt, the lecturer impressed on the audience the advisability of keeping their horses in sanitary stables and yards. A dressing of a 5 per cent. solution of formalin was recommended for canker, and dressings of calomel for thrush. Fistulous withers, or sinus of the withers, was common in Australia, due no doubt to the horse injuring the withers when passing through timber or rolling on stony ground. In the early stages, hot fomentations and liniments were recommended, but if the case was a serious one which demanded surgical treatment, a qualified veterinary surgeon should be called in.

Founder, or laminitis, was described as an inflammation of the sensitive membranes confined between the coffin bone and the hoof. Some horses were predisposed to founders, *e.g.*, heavy-bodied round-boned horses, fat ponies which did little work, and flat-footed horses. Bad shoeing may also cause founder. Concussion is the chief exciting cause—excessive fast work on hard roads. This ailment sometimes occurs from engorgement of the stomach with wheat, and also after foaling. The main symptoms consisted in stiffness and fever. The horse was unable to move and appeared set; he endeavored to rest on his heels; he backed with difficulty; and when the hind feet were affected they were placed right under the body. If attended to in the early stages treatment was usually successful, and consisted in the removal of the shoes and placing the feet in cold water, or a puddle of clay, or applying cold bran poultices. A dose of laxative medicine should be given and salines

such as Epsom salts or hyposulphite of soda should be given in the drinking water.

The symptoms of strangles, influenza, and tetanus were dealt with, and for the two former diseases the lecturer recommended isolation, early treatment, and cleaning and disinfection of premises. He deprecated the old method of allowing a disease like strangles to go through the stable. To prevent tetanus it was necessary to regularly remove manure from stables and yards, and all wounds in the animals should be cleansed and dressed with antiseptic lotions, *e.g.*, carbolic lotion (1 in 25), or lysols water (1 in 40).

The "bot" trouble was criticised, and the lecturer pointed out that it was an extremely rare condition to find the bot larvæ doing any material damage to horses. Stockowners could easily prevent the deposit of the eggs during the season by applying a little carbolic oil or kerosine and oil under jaws, or forearms, withers, and shoulders. The administration of drastic remedies to healthy-looking horses was a prevailing custom which should be stopped.

Digestive troubles were very common in South Australia, and those usually encountered were chiefly caused by dietetic errors.

The causes, symptoms, and treatment of the various colics were fully described, and for horses which showed symptoms of chronic indigestion, *e.g.*, impaired appetite, weakness, dry skin, and dung covered with mucus, the lecturer advised the administration of a purgative, followed by tonics such as gentian, ginger, nux vomica, &c.

For the removal of sand, bran and pollard mashes, in which was mixed a wineglassful of raw linseed oil, should be given for three or four days at a time, and this treatment should be adopted two or three times yearly.

Some excellent foaling slides were depicted, and the Government Veterinary Surgeon described in detail the best method to be carried out by stockowners in cases of difficult parturition.

A number of questions were asked and satisfactorily answered.



A Glimpse of Mount Gambier.

THE WHEAT MARKET.

According to the English produce journals there seems to be a good deal of uncertainty as to the future of the wheat market in the United Kingdom. It was at first reported that there was a very large surplus both in the Argentina and Canada. Subsequently, however, it was stated that much of the grain in both countries was of poor quality, and the railway strike in the Argentine and the block on the Canadian railways also had the effect of restricting the export. What the result will be when the wheat from those countries commences to move freely remains to be seen, but in the meantime it is satisfactory to note that the present price per bushel in South Australia is about 7d. more than it was at this time last year.

Writing under date, March 5th, *Broomhall's Corn Trade News* states—“Canada should be a generous source of supply during the remainder of the season, for with a visible supply of something like 48,000,000bush., according to Bradstreets, to say nothing of prospective additional receipts, there are assured weekly shipments for the remaining 21 weeks of the British cereal year of nearly 300,000 quarters per week, which occasionally may rise in the months of May-June to as much as 500,000 quarters. Such a weekly contribution from Canada would go a good way to make up for the predicated deficiency from Russia; but with only small contributions from the States, and moderate supplies at that period from Australia and Argentina, the total world's weekly shipment will probably not assume unwieldy proportions.”

The following table is taken from *Beerbohm's Corn Trade List* of March 8th:—

THE WORLD'S VISIBLE WHEAT SUPPLY ON MARCH 1ST.

	European. Qrs.	U.S., Canada. Qrs.	Total. Qrs.	Eng. Average Price. s. d.
1912	9,045,000	14,050,000	23,095,000	34 1
1911	12,875,000	8,965,000	21,840,000	30 2
1910	10,035,000	6,570,000	16,605,000	32 7
1909	9,180,000	8,400,000	17,580,000	34 6
1908	10,745,000	7,500,000	18,245,000	32 0
1907	9,055,000	10,050,000	19,105,000	26 9
1906	9,220,000	9,250,000	18,470,000	28 10
1905	9,620,000	7,125,000	16,735,000	30 10
1904	8,600,000	7,450,000	16,050,000	27 10
1903	6,832,000	10,190,000	17,022,000	25 3
1902	8,640,000	11,230,000	19,870,000	27 1
1901	9,090,000	10,960,000	20,050,000	25 11
1900	7,605,000	11,675,000	19,280,000	26 3
1899	7,720,000	7,025,000	14,745,000	25 7
1898	8,148,000	6,400,000	14,548,000	35 5
1897	8,435,000	7,940,000	16,375,000	28 2
1896	8,343,000	12,350,000	20,693,000	25 6

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Mar. 8	Steady, but quiet ..	3/7 to 3/7½	3/8 to 3/8½	3/8 to 3/8½
9	—	Do.	Do.	Do.
11	—	Do.	Do.	Do.
12	—	Do.	Do.	Do.
13	Firm; 3d. to 6d. dearer; Liverpool held for advance, but no demand	Do.	Do.	Do.
14	Quiet; Liverpool quiet, easier tendency	Do.	Do.	3/8
15	Quiet, easier tendency; Liverpool neglected	Do.	Do.	Do.
16	Dull; Liverpool steadily held, not active	Do.	Do.	Do.
17	Dull; Liverpool steady, slightly firmer..	Do.	Do.	Do.
18	—	Do.	Do.	3/8 to 3/8½
19	Firmer, improved demand; Jan.-Feb., 4/8½	Do.	3/8½ to 3/8½	Do.
20	Firm, but quiet; to arrive, 4/9; Liverpool held for advance	Do.	Do.	3/8½ to 3/8½
21	Firm, improved demand; Jan.-Feb., 4/9; Liverpool firm; Feb.-Mar., 4/9½	3/8	Do.	Do.
22	Firmly held at full rates; Feb.-Mar., 4/9; Liverpool firmer	3/7 to 3/8	3/9 to 3/9½	3/9
23	Held for 3d. advance; Jan.-Feb., 4/9; Liverpool quiet but firm	3/7½ to 3/8	Do.	Do.
24	—	Do.	Do.	3/9½
25	—	3/8 to 3/8½	Do.	Do.
26	Firm and more inquiry ..	Do.	Do.	Do.
27	Firm; several Jan.-Feb. 4/8½ to 4/9½; Dec.-Jan., 4/9½; Nov.-Dec., 4/10½	Do.	Do.	Do.
28	Firm but quiet; Dec.-Jan., 4/10½; Feb.-Mar., 4/9½; off coast, 4/9; Liverpool firm, less active	Do.	Do.	Do.
29	Steady, but quiet; Liverpool firm but quiet ..	3/8½ to 3/9	3/10	3/10
30	Held for 3d. advance; Dec.-Jan., 4/9½; Liverpool, fair inquiry; Feb.-Mar., 4/10½	Do.	Do.	Do.
April 1	—	3/8½ to 3/9½	3/10 to 3/10½	3/10½
2	Firmly held at full rates; good demand; Jan.-Feb., 4/9½ ..	3/9 to 3/9½	Do.	Do.
3	Firm, but quiet; Feb.-Mar., 4/10; Liverpool, firm but inactive; Dec.-Jan., 4/10	Do.	Do.	3/10 to 3/10½
4	Firm; Liverpool firmly held, but inactive ..	Do.	Do.	Do.
5	Firm ..	Do.	Do.	Do.
6	—	Do.	Do.	Do.
8	—	Do.	Do.	Do.

STEAMER FREIGHTS.—Steamers from South Australia to United Kingdom-Continent, full cargo rates 30s. to 31s. 3d. per ton (9½d. to 10½d. per bush.) according to position. Parcels, Port Adelaide to London-Liverpool, 29s. per ton (9½d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SAILER FREIGHTS.—From South Australia to United Kingdom-Continent, 30s. to 32s. 6d. per ton (9½d. to 10½d. per bush.) to South Africa, 25s. to 27s. 6d. per ton (8d. to 8½d. per bush.).

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on April 1st:—

BUTTER.

Considering the period of the year, the supply of cream coming to hand has been very fair, though owing to the changeable weather experienced it has been intermittent. The quality of the butter has been well maintained. Prices have eased slightly during the month, the current rates being—superfine, 1s. 4½d.; pure creamery, 1s. 3½d.

Messrs. A. W. Sandford & Co., Limited, report on April 1st:—

BUTTER.—The market throughout March was of a very active character, the trade operating spiritedly for the requirements, especially in top grades, supplies of such being limited. This was due to the unusually long dry spell of hot weather, accompanied by sultry conditions, which made it more difficult for dairy folk to make and market their butter up to the usual standard quality, and also prevented them sending their cream away in the best of order. Best factory and creamery, fresh in prints, was quoted at from 1s. 3d. to 1s. 4½d. per lb.; choice separators and dairies, 1s. 2d. to 1s. 3d.; weather-affected lots 1½d. to 1s. 0½d.; store and collectors', 1½d. to 1s.; heated lots down to 10d.

EGGS.—The continued increasing demand for export as well as inland trade has assisted in keeping prices up. Indeed, average higher figures have obtained this year than formerly, and at the last sales of the month the market closed firm. Prime guaranteed new-laid hen sold at 1s. 2½d. per doz.; duck, 1s. 3d.

CHEESE.—It is pleasing to report that despite the heavier output from South Australian factories, excellent clearances have been effected; consequently active rates ruled. Quotations, 8½d. to 9d. for large to loaf sizes.

BACON.—The continuance of summer demand has kept stocks from accumulating, and as these are now light, values are firm for established brands of factory-cured sides, middles, and rolls. Hams are moving more freely. Best factory-cured sides, 7d. to 8d.; hams, 9d. to 1½d.

HONEY.—The trade are now recognising that the yield this season is light, and are readily purchasing all consignments of prime flavored clear extracted at full rates, viz., 3d. to 3½d.; beeswax, 1s. 3d.

ALMONDS.—The new season's are now offering, and as export buyers are inquiring, speedy clearances are effected. Quotations are—Brandis, 6d.; mixed softshells, 5½d.; kernels, 1s. 1½d.

LIVE POULTRY.—The forwardings for this period of the year have been unusually heavy, but as the demand continues equally as active, especially for all coops of prime conditioned table birds, selling rates for these have well held. Light weights or weedy sorts have, however, met a market according to their condition. Good table roosters brought 2s. 9d. to 3s. 3d. each; hens, 1s. 10d. to 2s. 2d.; light cockerels, 1s. 6d. to 2s.; ducks, 1s. 9d. to 2s. 6d.; geese, 3s. to 3s. 9d.; pigeons, 6½d.; turkeys from 6d. to 1½d. per lb. live weight for medium to prime table sorts.

POTATOES.—These experienced a strong inquiry, with the result that the trend of values was decidedly towards firming. Unfortunately, however, the first or early crop of Gambiers this season is unusually light, and to fill additional requirements shipments have been landed from Victoria. At the end of the month Gambiers were quoted at £8 7s. 6d. to £8 15s. on trucks, Mount Gambier.

ONIONS.—Supplies of this tuber have been coming mostly from the late districts in the hills, and also from Gambier. Although prices are higher than usual, a good substantial turnover has been experienced, hills onions finding market at from £10 to £11 per ton, whilst Gambiers are quoted at from £8 5s. to £9 per ton on trucks there.

RAINFALL TABLE.

The following table shows the rainfall for March, 1912, at the undermentioned stations, also the average total rainfall for the first three months in the year, and the total for the first three months of 1912 and 1911 respectively:—

Station.	For Mar., 1912.	A'v'ge. to End Mar.	To End Mar., 1912.	To End Mar., 1911.	Station.	For Mar., 1912.	A'v'ge. to End Mar.	To End Mar., 1912.	To End Mar., 1911.
Adelaide	0.67	2.52	1.21	2.35	Hamley Bridge	0.47	2.20	0.83	2.56
Hawker	1.83	1.59	2.17	1.35	Kapunda....	0.56	2.52	0.94	3.41
Craddock.....	1.14	1.78	1.40	1.01	Freeling.....	0.49	2.17	1.04	3.65
Wilson.....	1.80	1.74	2.80	0.62	Stockwell ...	0.92	2.15	1.31	3.78
Gordon.....	1.38	1.76	1.96	1.42	Nuriootpa ..	0.63	2.35	1.02	2.54
Quorn.....	3.53	1.64	4.11	1.06	Angaston ...	1.02	2.29	1.48	3.73
Port Augusta	1.48	1.75	2.24	1.48	Tanunda	1.54	2.59	2.02	4.12
Port Germein	0.48	1.73	0.88	2.79	Lyndoch ...	0.91	2.29	1.46	2.22
Port Pirie ...	0.22	1.77	0.88	3.19	Mallala	0.67	2.18	0.98	1.92
Crystal Brook	0.77	1.81	1.30	2.92	Roseworthy ..	0.53	2.11	0.90	2.33
Pt. Broughton	1.07	1.79	1.65	4.11	Gawler.....	0.48	2.40	1.00	2.28
Bute.....	0.88	1.74	1.32	3.48	Smithfield ..	0.30	2.41	0.85	2.56
Hammond ..	0.89	1.70	1.49	0.84	Two Wells...	0.66	2.12	1.00	1.68
Bruce.....	1.21	1.67	1.89	1.23	Virginia.....	0.79	2.22	1.21	1.93
Wilmingt'n ..	2.52	1.97	3.33	4.04	Salisbury ...	0.87	2.35	1.34	3.57
Melrose.....	1.93	3.09	2.51	4.59	Teatree Gully	0.98	3.38	1.75	2.71
Boooleroo Cntr	0.92	1.95	1.36	1.50	Magill.....	1.02	2.97	1.91	2.90
Wirrabara ...	0.86	2.13	1.57	2.21	Mitcham.....	0.68	2.44	1.08	3.06
Appila.....	0.79	2.18	1.21	2.03	Crafers.....	2.26	4.39	3.52	5.90
Laura.....	0.75	2.09	1.08	2.81	Clarendon ..	0.98	3.61	1.72	4.24
Caltowie	0.74	2.14	1.12	2.77	Morphett Vale	0.46	2.74	0.90	3.52
Jamestown ..	1.15	2.16	1.77	3.07	Noarlunga...	0.31	2.32	0.63	3.84
Gladstone ..	0.52	1.88	0.87	3.12	Willunga ...	0.51	2.75	1.11	4.05
Georgetown ..	0.52	2.25	1.23	3.01	Aldinga.....	0.40	2.62	0.84	2.30
Narridy.....	0.50	2.15	1.11	2.61	Normanville.	0.48	2.13	0.94	3.09
Redhill.....	0.97	1.85	1.84	2.35	Yankalilla...	0.66	2.43	1.15	2.88
Koolunga ...	0.79	1.98	1.36	2.50	Eudunda.....	1.42	1.95	2.13	3.30
Carrieton...	0.87	1.72	1.34	0.78	Sutherlands ..	1.33	—	1.96	1.66
Eurelia.....	1.06	1.79	1.94	1.67	Truro.....	1.29	2.14	1.93	3.45
Johnsburg...	1.18	1.41	1.51	1.07	Palmer.....	1.25	—	1.47	3.23
Orroroo.....	1.26	2.33	1.82	0.93	Mt. Pleasant.	0.47	2.72	1.25	3.55
Black Rock ..	0.71	2.00	1.17	1.19	Blumberg ...	1.11	3.09	1.81	3.65
Petersburg ..	1.33	2.06	2.13	1.97	Gumeracha ..	1.31	3.21	2.16	4.25
Yongala.....	0.58	1.86	1.23	1.95	Lobethal	1.48	3.18	2.31	3.05
Terowie.....	1.02	2.00	1.43	2.77	Woodside ...	1.48	3.02	2.43	3.40
Yarcowie....	1.17	1.98	1.62	2.62	Hahndorf ...	1.20	3.33	1.87	4.78
Hallett.....	0.65	1.95	1.32	2.77	Nairne.....	1.06	3.20	2.06	5.65
Mount Bryan	0.71	1.79	1.56	2.66	Mount Barker	1.35	3.30	1.95	4.19
Burra.....	0.92	2.35	1.45	3.49	Echunga.....	1.82	3.30	2.35	4.38
Snowtown...	1.70	1.82	1.96	2.35	Macclesfield..	1.49	2.96	1.96	4.33
Brinkworth..	0.62	1.96	1.12	2.89	Meadows ...	1.71	3.67	2.02	5.44
Blyth.....	0.91	1.98	1.51	2.63	Strathalbyn ..	1.10	2.40	2.20	3.49
Clare.....	1.33	2.75	2.11	3.45	Callington ..	0.61	2.18	1.09	2.60
Mintaro Cntrl.	0.96	2.12	1.48	3.90	Langh'me's B.	0.42	1.94	1.19	2.17
Watervale...	1.46	2.65	2.29	4.95	Milang.....	0.35	2.16	1.04	1.69
Auburn.....	1.11	2.96	1.98	4.02	Wallaroo ...	0.99	1.83	1.81	2.30
Manoora.....	0.94	1.92	1.69	2.44	Kadina.....	1.38	1.88	2.08	2.48
Hoyleton....	0.73	2.20	0.76	4.12	Moonta.....	1.17	1.87	1.77	2.89
Balaklava ..	0.75	2.01	1.04	3.77	Green's Plains	0.80	1.57	1.29	2.31
Pt. Wakefield	0.87	2.12	1.71	5.90	Maitland ...	0.93	2.00	1.36	4.13
Saddleworth	0.84	2.53	1.55	2.31	Ardrossan ..	1.70	1.62	2.06	2.39
Marrabel ...	0.57	2.10	1.20	1.90	Pt. Victoria ..	1.02	1.56	1.67	3.05
Riverton ...	0.61	2.41	1.32	3.28	Curramulka..	1.74	2.01	2.05	2.71
Tarlee.....	0.75	2.16	1.49	2.39	Minlaton ...	1.17	1.74	1.76	2.27
Stockport...	0.41	2.11	1.00	2.24	Stansbury ..	1.79	1.81	2.21	2.29

RAINFALL TABLE—*continued*

Station.	For Mar., 1912.	A'v'ge. to End Mar.	To End Mar., 1912.	To End Mar., 1911.	Station.	For Mar., 1912.	A'v'ge. to End Mar.	To End Mar., 1912.	To End Mar., 1911.
Warooka ...	1.33	1.58	1.88	4.28	Bordertown..	0.60	2.17	0.69	3.19
Yorke town ..	1.52	1.63	2.27	3.25	Wolseley ...	0.22	1.82	0.27	3.10
Edithburgh..	1.39	1.85	1.89	2.23	Frances	0.97	2.18	1.39	3.84
Fowler's Bay	1.25	1.40	1.64	1.18	Naracoorte ..	1.18	2.53	1.70	3.78
Streaky Bay.	1.03	1.63	1.74	1.95	Lucindale ...	0.66	2.36	1.13	4.09
Pt. Elliston..	1.79	1.41	2.06	2.03	Penola	1.40	3.20	2.88	5.04
Pt. Lincoln...	4.22	2.07	5.23	2.21	Millicent	0.89	3.31	2.56	6.49
Cowell	2.13	1.66	2.99	1.31	Mt. Gambier.	1.09	4.02	3.37	6.52
Queenscliffe..	1.43	1.72	2.27	—	Wellington ..	0.43	2.21	0.70	3.58
Port Elliot...	1.08	1.48	1.87	2.24	Murray Bdg.	0.44	2.07	0.61	2.93
Goolwa	0.85	2.31	1.78	3.67	Mannum	0.71	1.79	0.81	1.74
Meningie ...	0.58	2.21	1.30	2.62	Morgan	1.12	1.47	1.60	2.85
Kingston....	0.84	2.45	1.87	4.16	Overland Crnr.	0.71	1.96	1.06	4.25
Robe	0.62	2.53	1.72	4.85	Renmark.....	0.42	1.73	1.21	4.69
Beachport...	0.91	3.06	1.77	5.46	Lameroo	0.37	—	0.54	1.99
Coonalpyn...	0.48	2.05	0.90	3.38					



TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of 6,000 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		April.	May.			April.	May.
Amyton	960	—	—	Miltalie	974	27	25
Angaston	967	27	25	Minlaton	*	6	25
Appila-Yarrowie	*	—	—	Mitchell	*	—	25
Arden Vale & Wyacca	†	—	—	Monarto South	*	—	—
Arthurton	*	—	—	Monteith	*	—	—
Balaklava	*	—	—	Moonta	*	—	—
Beetaloo Valley	*	—	—	Moorlands	*	—	—
Belalie North	†	27	25	Morchard	961	—	—
Blyth	968	23	28	Morgan	*	—	—
Bowhill	*	—	—	Morphett Vale	*	—	—
Bowmans	*	25	30	Mount Barker	982	25	30
Bute	*	—	—	Mount Bryan	*	27	25
Butler	*	—	—	Mount Bryan East	*	6	4
Caltowie	*	27	25	Mount Gambier	*	—	—
Carrieton	*	25	30	Mount Pleasant	985	12	10
Cherry Gardens	979	2	28	Mount Remarkable	962	24	29
Clare	968-70	26	31	Mundooora	965	—	—
Clarendon	*	1	27	Nantawarra	971	24	29
Colton	*	—	25	Naracorte	986	13	11
Coomooroo	*	—	—	Narridy	†	—	—
Coonalpyn	*	—	—	Narrung	†	—	—
Coorabie	973	27	25	Northfield	971	2	7
Craddock	961	—	—	Parrakie	977	6	4
Crystal Brook	*	—	—	Paskeville	†	25	30
Cummins	*	27	25	Penola	*	6	4
Davenport	†	—	—	Penong	*	13	11
Dawson	*	—	—	Petina	*	—	—
Dingabledinga	*	12	10	Pine Forest	*	2	28
Dowlingville	*	—	—	Pinnaroo	*	28	—
Elbow Hill	973	—	—	Port Broughton	*	26	31
Forest Range	*	25	30	Port Elliot	*	—	18
Forster	975	20	18	Port Germein	*	—	—
Frances	*	26	24	Port Pirie	965-6	8	4
Freeling	970	—	—	Quorn	†	—	—
Gawler River	*	—	—	Redhill	966	30	28
Georgetown	*	27	25	Renmark	*	—	—
Geranium	975	27	25	Riverton	*	—	—
Green Patch	*	1	27	Saddleworth	*	19	17
Gumeracha	*	1	27	Salisbury	972	2	7
Hartley	979	27	25	Shannon	*	—	—
Hawker	*	1	27	Sherlock	*	—	—
Hookina	961	—	—	Stockport	*	—	—
Ironbank	980	26	31	Strathalbyn	†	1	27
Kadina	*	2	23	Sutherlands	*	—	—
Kalangadoo	*	13	11	Tatiara	*	6	4
Kanmantoo	980	27	25	Uraidla and Summert'n	†	1	6
Keith	†	—	25	Utera Plains	974	27	25
Kingscote	†	2	7	Walkerie	977	—	—
Kingston	*	27	25	Warcovie	962	—	—
Koppio	973	—	30	Watervale	*	—	—
Kybybolite	*	25	30	Wepowie	*	—	—
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Meadows	982	—	—	Yongala Vale	†	27	25
Meningie	†	—	25	Yorketown	*	13	11
Millicent	*	9	14				

* No report received during the month of March. † Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by GEORGE G. NICHOLLS.

UPPER-NORTH DISTRICT. (PETERSBURG AND NORTHWARD.)

Amyton, March 5.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. J. J. Cormack (chair), S. Thomas, R. Brown, T. Griffin, T. Ward, W. Gum, T. Moten, and H. Crisp (Hon. Sec.).

CARE OF HIDES AND SKINS.—Mr. J. J. Cormack read a paper on this subject as follows:—"Complaints have come to hand from time to time concerning the inefficient and careless handling of hides and sheepskins by stockowners, and this is undoubtedly at times accountable for the very low prices which various consignments realise. I have heard severe comment made by consignors, even as far as reflecting on the honesty of skin brokers, when the fault of such low prices lay at their own doors; and the broker who was blamed had really done his utmost to obtain the best price consistent with the condition of the consignment. I have made a point of ascertaining from men of long experience in the trade the best possible way to preserve hides and skins from the time they are flayed until they reach the broker, and I can unhesitatingly say that thousands of pounds are annually lost to the stockowners and farmers through careless flaying and neglect in properly preserving. Complaints have frequently appeared in the press concerning the carelessness displayed in flaying, and hides have been rendered useless for leather by being slit and cut through in the most valuable parts. On this account a hide which should realise 6d. to 7d. per pound does not realise half that price. It is most essential that great care should be taken in the flaying of hides and skins if the owner is desirous of obtaining the best possible value for them. Skins and hides should not be allowed to become tainted, as by this means the value is considerably reduced. A liberal application of salt to hides immediately after they are flayed is necessary. The salt needs rubbing all over the fleshy side, care being taken to apply it right to the edges, which are inclined to turn inwards, and if not salted quickly become tainted, especially during the summer months. It is also necessary to dispose of hides as soon as possible after they are taken off. Sheepskins also need very careful attention. The habit of throwing them over a rail, exposed to the sun, is not a good one; and yet this is the general way in which sheepskins are cared for on many stations and farms. As a consequence there is a big deterioration in value. By exposure to the sun the basil loses its flexibility and becomes dry and withered, and to a certain extent it is spoiled. The skins so treated become badly infested with weevil, which render the pelt absolutely useless to the tanner. With skins as with hides, good flaying is most necessary, and they should be dried in the shade, and kept free from weevil. I find it a good plan to hang the skins by the tail and hind leg strips, using S hooks of wire, from the roof of a shed, taking care not to let the skins touch each other. They will dry in this way splendidly, and I have never had them affected by weevil. I consign my sheepskins regularly, as they are sold by weight, and the longer the skins are kept the lighter they get. When keeping skins for any length of time it is advisable to purchase weevil wash, which can be obtained cheaply from any skin broker, and paint the skins as is done on the outback stations. By paying more attention to skins and hides on the farm and station owners will have less cause to complain of the brokers who sell for them." Mr. W. Gum instanced a case where skins had been kept for four weeks and rendered absolutely useless by weevil. If they were to be kept for any length of time it was essential that they should be painted with weevil wash.

Cradock, March 16.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. M. J. McAuley (chair), Clark, Patterson, Jago, Hilder, Glasson, Smyth, Solly, Gillick, and Lindo.

DRILLING OR BROADCASTING.—The relative advantages attending the practices of drilling and broadcasting seed were duly considered, and members agreed in the opinion that the former was preferable, more particularly on fallowed land.

Hookina, March 2.

PRESENT.—Messrs. S. Stone (chair), P. and G. Kelly, Woods, Henschke, Murphy F. Stone, Madigan, (Hon. Sec.) and five visitors.

MIXED FARMING.—Mr. F. Stone contributed the following paper:—"If mixed farming is to be carried on, a holding must be divided into small paddocks, which should be securely fenced with six wires, and posts not more than 5 yds. apart. Wire netting should be used in the erection of the boundary fence. Endeavor to leave a few trees in each paddock to shelter stock from bad weather. A cultivation paddock is better if a bit of grazing land is left in, as it often happens that stock are in these paddocks during wet weather, when the grazing land is a good deal firmer than that which has been cultivated. A most important matter is the water supply. If underground springs cannot be located by well-sinking in every paddock, dams should be made. Use these for winter and leave the wells for summer use, which will assure the stock getting water during the hot weather with little travelling. When a farmer is busy with harvest work he has not time to drive stock to adjacent paddocks for water, neither does the stock thrive so well as when allowed free access to the watering places. For providing water on farms windmills seem to be the most useful and economical means. In a carefully-planned farm one well and windmill erected in a central position will water three or four paddocks. Cattle and horses should be allowed to graze in a paddock prior to sheep being put in, as they thin out the grass which, when high and in seed, spoils the wool, and often causes blindness in the sheep. Sheep will do well on little feed in summer when they are provided with plenty of water, and are frequently changed from paddock to paddock. Do not allow sheep, horses, and cattle to run in the same paddock, and never give them the run of all paddocks. Fences must be kept in good repair. Wheat-growing undoubtedly pays best, and therefore receives more attention than other branches of agriculture. Up-to-date farm implements should be used, as they represent a saving in time and labor. Horses are best for farm work, and a good team should be kept, including a few mares from which to breed. Matters can be so arranged that little work is lost by the rearing of foals, provided the farmer is a careful and capable driver. The man who is able to sell a couple of horses every year finds his income considerably increased. With all classes of stock the best animals only should be bred from."

Morchard, February 9.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. R. Kitto (chair), W. Toop, H. Laskey, G. Parsons, E. D. Kirkland, W. Munro, H. Kupke, W. A. Toop, and one visitor.

STONE-GATHERING.—The following paper on this subject was read by Mr. H. Kupke:—"All stones should be carted off as soon as they are brought to the surface of the ground. The best method is with the tip-dray and three horses, and there should be three men to do the work. One man should work each side of the dray. Cool weather should be chosen for the work, as it is very tiresome in hot weather. When new land is broken up it may be harrowed before the stones are cleared, as it makes the work much easier. When the fallow is worked again more will come to the top. Farmers in some cases have been cultivating their land for the last 30 years or more, year after year going over the stones with the plough, harrows, cultivator, drill, binder, harvester, or stripper, &c. The wear and tear on the machinery in one year is far greater than the cost of clearing the stones. Stones are far more troublesome than stumps with all classes of machinery. Farmers frequently say that there is not time to clear them up. If this is the case would it not pay to engage extra hands to do the work, rather than be faced with the necessity

of purchasing new machinery every three or four years? For the last 20 years I have had to cart stones off my land. I have taken off as much as 300 three-horse loads in one year. Had I not done so my machinery bill would have been much greater than the cost of labor for clearing the land." Members generally agreed with the statements contained in the paper. Mr. W. Toop drew attention to the fact that it was advisable to cart the stones into gutters and washouts. If they were placed in heaps rabbits would utilise the shelter afforded. Mr. R. Kitto had very frequently noticed that the best crops were on stony ground.

Mount Remarkable, February 28.

(Average annual rainfall, 21in.)

PRESENT.—Messrs. L. A. Bauer (chair), W. Foot, W. Oldland, J. McIntosh, L. George, and H. H. Davie (Hon. Sec.).

MELROSE WATER SCHEME.—The Hon. Secretary brought forward for the consideration of the Branch the suggestion that steps should be taken to obtain a reservoir on the Willochra Creek for the purpose of securing a water supply for Melrose, Booleroo Centre, Willowie, Pinda, and Hammond. He pointed out that the undertaking could be carried out with less expense than was entailed by most of the water schemes at present working in South Australia, and estimated the area that would come within the scope of the work at 200 square miles. Members decided that the Hon. Secretary should confer, with a view to arranging a public meeting, with Mr. A. W. F. Ey, who had already taken levels and done much preparatory work. Members expressed the hope that the residents of Booleroo Centre and Willochra would use every endeavor to help on the scheme, which would provide for the settlement of hundreds more families in the district.

Warcowie, March 1.

PRESENT.—Messrs. McAskill (chair), Telfer, W. Webb, Taylor, W. Sanders, W. Crossman, Bennett, J. Duffy, Feinler (Hon. Sec.), and five visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—The suggested substitution of the system of weighing wheat in bulk for that already in vogue was duly considered. The Chairman stated that he had, when farming at Wasleys, weighed 80 four-hushel bags of wheat carefully and accurately on an Avery scales, bag by bag, and then weighed them on a weighbridge. The latter resulted in a gain of 15lbs. weight. This, members agreed, showed how accurate a weighbridge could be. Members thought a great saving of time and labor would be effected and more general satisfaction would be secured by the adoption of the proposal.

Farm Laborers' Blocks.—The proposal to survey small blocks for farm laborers in new hundreds did not present itself to the majority of members as being capable of being carried out in accordance with the ideas embodied in the scheme. Members thought that if the laborer was provided with a holding of his own title his time would be taken up on it just when his services were required by the farmer. The Branch decided not to support the idea.

Selling Cattle by Live Weight.—A discussion took place with reference to selling cattle by live weight, and members approved of the proposal to institute the system.

Willowie, March 1.

(Average annual rainfall, 11·61in.)

PRESENT.—Messrs. T. Hawke (chair), L. and I. McCallum, L. Hughes, A. Gray, J. Stone, W. P. Foulis (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—Members were opposed to the idea. They considered that though perhaps the weights would be more accurate, the method would be slower when there was a rush at the stations, and the agents would not have an opportunity of detecting light bags. This would give unscrupulous men an opportunity to defraud. They also thought the method would be costly, and that the benefits derived would not compensate for the extra cost.

Selling Cattle by Live Weight.—Members thought the system of selling cattle by live weight too cumbersome to be of advantage.

Farm Laborers' Blocks.—The proposal that the Government should survey small blocks in new hundreds for farm laborers was considered. Members agreed with the idea, but thought 20-acre blocks would be quite large enough.

Willowie, March 19.

(Average annual rainfall, 11·61in.)

PRESENT.—Messrs. T. Hawke (chair), A. W. Howard, E. S. Bristow, S. Bull, W. R. Greig, S. Tucker, L. Hughes, D. McCallum, Basley, J. Stone, W. P. Foulis (Hon. Sec.), and four visitors.

WATER SUPPLY FOR WILLOWIE.—Mr. L. Hughes contributed a paper in which he pointed out that there were four available sources of water supply for the Willowie district, viz., the Spring Creek Weir, Gregory's Well, Willowie Springs, and the Blight's Estate water. An abundant flow could be secured from the Spring Creek Weir, but the long distance over which the pipes would have to be laid made the scheme an expensive one. For the second alternative it would be necessary to raise the water from the creek to a 30,000gall. tank, from which it would flow by gravitation to the township, supplying a number of farmers *en route*. To take advantage of the Willowie Springs supply a weir would have to be built, and the water distributed by gravitation. However, the best means of supplying the township would be to purchase an acre of Blight's Estate, and on this sink a well say 6ft. by 6ft. A 12-horsepower engine would raise the water to a 30,000gall. or 40,000gall. tank. This could be raised to a height of 4ft. on concrete, which would be easily obtained, as there was plenty of sand in the creek. It would only be necessary to fill the tank two or three times weekly, and the outlay for pipes would not be heavy. The whole scheme should not cost more than £400. A good discussion followed the reading of the paper. Mr. Tucker thought Mr. Hughes's estimate of the cost of the Blight's Estate scheme altogether too low. Something should be done to give the district a water supply as soon as possible, for it was capable of carrying a much greater number of stock provided permanent water was available. He favored the Gregory's Well scheme. Mr. Bristow thought the water rates would be a burden to those who had gone to the expense of putting down tanks and dams. The Chairman thought a direct pipe line from Gregory's Well would be the most profitable undertaking. Weeds and debris accumulated in the Willowie Springs, which made it undesirable to connect with this source. The Hon. Secretary said a large scheme, embracing the conservation of flood waters and connecting with Gregory's Well, would best secure the interests of the district. The following resolution was unanimously carried:—"This Branch of the Agricultural Bureau favors a scheme for the supply of water for this district from Gregory's Well, the pipe line to be as direct as possible."

Wilmington, February 28.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. S. George (chair), D. George, McGhee, Noll, J. and G. Schuppan, A. R. and E. J. Gloede, B. Litchfield, J. Zimmermann, and R. B. Scholefield.

FARM HARNESS.—Mr. D. George read the following short paper:—"Harness should always be taken off horses when they are feeding, and hung up out of the weather. When not in use collars should receive special attention, and be kept in good repair. All leather should be washed in warm water and soft soap twice a year, and when thoroughly dry should be oiled with neatsfoot oil. The proper time for this treatment is during the months of March and September."

SORE SHOULDERS.—Mr. D. George dealt with this subject in a paper as follows:—"It is difficult to say whether sore shoulders can be cured while the horse is being worked. They certainly can be prevented by washing the shoulders with water morning and night for 8 or 10 days just before commencing hard work. Some farmers think it too much trouble to take the harness off horses when they are feeding for dinner-hour, or even

clean off the horses; but both should be done. A good brushing each day cleanses horses, and tends to improve their health. They work better, and the short time spent in brushing will be well repaid."

Wilmington, March 27.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. J. Hannagan (chair), A. R. and E. J. Gloede, S. Robertson, B. J. Litchfield, J. F. Jacobs, A. H. Noll, E. McGhee, W. and G. Schuppan, D. and S. George, W. Hill, W. Slee, B. Jericho (Hon. Sec.), and one visitor.

TREATMENT OF SEED WHEAT.—The following paper was read by Mr. G. Schuppan:—"There is not half enough attention paid to obtaining seed wheat true to type and name. If farmers would take a little more interest in selecting their seed, it would certainly be to their benefit. How often do we see a field where we can distinctly see two or even three different varieties in one crop. One cannot always get his seed as pure as it should be; but when one has it clean it should be kept so. With the up-to-date machinery now at the disposal of the farmer this should be little trouble. When securing seed always see that it is perfectly ripe. Take time and patience to clean or grade it. I prefer grading, as it is more satisfactory and more profitable, for all the small and cracked grain can be saved. Fifty pounds of graded wheat is equal to 60 lbs. that has not been graded. If a farmer puts in about 300 acres this saving of 10 lbs. per acre equals 50 bush. on 300 acres; at 3s. 3d. per bushel this is equal to £8 2s. 6d. per year. If the wheat shows any signs of smut it should be pickled. When required for sowing in the early part of the season, while the ground is in a dry state, it should be pickled about two weeks before seeding, to give it a fair chance to dry out properly. If sown soon after pickling, while the grain is moist, it comes in contact with the manure, which draws moisture out of the soil. This may not be sufficient to cause the seed to germinate, but causes it to mould. The quantity of bluestone to be used should be according to the seed. If it is free from smut it will not require a strong solution: but 1 lb. of bluestone to 8 bush. of wheat is enough at any time. If a stronger solution is used, it may be injurious to the wheat. Always sow new wheat if possible." To illustrate the advisableness of sowing new grain, Mr. Schuppan gave the following results of experiments he had conducted:—Of 50 grains new wheat sown, unpickled, 50 grains grew; of 50 grains old wheat sown, and pickled with ½ lb. bluestone per bushel, 32 grains grew; of 50 grains new wheat sown, and pickled with ½ lb. bluestone per bushel, 48 grains grew; of 50 grains old wheat sown, and pickled with ½ lb. bluestone per bushel, 28 grains grew; of 50 grains new wheat sown, and pickled with ½ lb. bluestone per bushel, 32 grains grew; of 50 grains old wheat sown, and pickled with ½ lb. bluestone per bushel, 22 grains grew. Of the 150 grains of new wheat 130 grew, while of the 150 grains of old wheat only 82 grew. In discussing the subject, Mr. D. George agreed that the seed taken from new wheat was preferable to old seed wheat. When required for sowing on dry ground, the seed should be pickled 14 days previous to seeding, otherwise the moist wheat would draw the super. and start the grain. Mr. Noll had for years used cold water when pickling grain, and his crops had not been smutty. The grain dried more quickly when cold water was used.

Wirrabara, March 2.

(Average annual rainfall, 30 in.)

PRESENT.—Messrs. E. J. Stevens (chair), P. and H. Lawson, C. F. H. Bowers, J. Kendrick, J. and C. Hollett, W. Marner, W. Bowman, A. E. Stott, J. F. Pitman, S. Thistleton, W. Stevens, and A. R. Woodlands (Hon. Sec.).

CULTIVATING AT SEEDING TIME.—A long discussion on the relative advantages of the disc harrow and the skim plough for seeding operations took place. Members favored the use of the latter.

STINKWORT.—Mr. J. Kendrick initiated a discussion on the value of dragging discarded rails from the railways over grazing country for the purpose of destroying stinkwort. He explained that in the southern parts of the State this was done with the idea of destroying ferns. Members were of opinion that the toughness of the plant would preclude any successful results attending the operation.

MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

Mundoora, March 2.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. C. H. Button (chair), A. H. Cornelius, J. H. Shearer, G. M. Wilson, and W. J. Shearer (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Farm Laborers' Blocks.—The proposal that the Government should survey small blocks in new hundreds to provide holdings for farm laborers was duly discussed. Members did not think the idea practicable, and suggested as an alternative scheme that a farmer employing a married man should give him the fixed tenure of a comfortable house and a small area of land for his own use.

Port Pirie, February 3.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. Welch (chair), Munday, Johns, Hawkins, Lawrie, Greig, Birks, Wright (Hon. Sec.), and one visitor.

A RETROSPECT.—Mr. Thos. Johns contributed an interesting paper, in which he dealt with the various features of the weather conditions during the 1911 season, and pointed out the effects on crops generally. Continuing, he said—"There is no doubt that had it not been for the heavy rainfall of 1910 leaving moisture in the subsoil, the crops and feed would have been very much worse than they were. There is a point in connection with our fallows that we will do well to note. Last year quite a number of farmers claimed to have got a better result from their fallow that was not worked. They followed on the same lines, but found that their claim was unfounded. The crops generally were comparatively free from disease. There was very little takeall, which bears out the statement that takeall is worse in wet seasons. Red rust made its appearance early in the season, but there is no doubt that dry weather held it in check. There was comparatively little black rust, but altogether too much smut." In discussing the paper Mr. Munday said crops would probably not have yielded so well had it not been for the heavy rainfall of the previous year. The three days' heat wave toward the end of October had done more harm to his crop than anything else. The crops in Wandearah had been reduced in yield quite one-third on account of the heat. On the whole they were free from disease. Red rust, however, appeared in July—a crop of Jonathan being rather badly affected—but owing to the dry spell at the latter end of the season the yield was not affected to any great extent. Smut or bunt could be prevented by careful pickling. He took the precaution to pickle his seed wheat at least two or three weeks prior to sowing, and had proved that if this course was adopted there would be very little smut in the crops. His best wheat last season was Comeback No. 6. Late Gluyas yielded next best. Red rust affected Gluyas, whilst Comeback was free from it. Carmichael's Eclipse, sown under good conditions, although a promising-looking crop, had not yielded well. Mr. Hawkins said his best yields were from Eclipse, Gluyas, and King's Red, the first-named being the best. He usually pickled about a fortnight before sowing, and was not troubled with smut. His crops sown after the rain had yielded 6bush. per acre more than those sown dry. Mr. Greig had grown wheat for 14 years, and had never been docked for smut in the sample. There were conditions under which pickling was unnecessary, and it was not advisable to do this if the wheat was free from smut, as the pickle had a harmful effect on the germination and growth of the plant. He had grown Bobs, Gluyas, and Golden Drop wheat last season, the last-named being an early-maturing variety, which he thought would prove well suited to local conditions. The Chairman said Carmichael's Eclipse had not been a success—the sample being smutty. He also grew Gluyas and King's Early wheats, both of which he preferred to the first-named variety. Mr. Johns, in replying, mentioned that Comeback No. 6 had done best with him last season. Gluyas came next, but Eclipse was rather poor. Bluestone pickle handicapped the crop, and a strong solution was detrimental to the health of the wheat plant.

It did not matter how early the wheat was pickled before sowing if a weak solution was used. He had sown Comeback No. 6 wheat, both pickled and unpickled, in the same paddock under similar conditions, and had obtained a yield of several bushels less per acre from the pickled portion of the crop.

Port Pirie, February 28.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Welch (chair), Greig, Hector, Eagle, T. and F. Johns, Richter, Jose, A. M. Lawrie, Wright (Hon. Sec.), and two visitors.

WHEAT: EARLY OR LATE SOWING.—Mr. E. J. Eagle read a paper, which was also read at the Conference of Northern Branches at Crystal Brook, and which will be found on page 939 of the current issue. In discussing the subject, Mr. Johns said experts had advocated sowing late wheats early and early varieties late; but he did not think this was a good plan to adopt. It was an advantage to have a portion of the crop in early, so that it would be ready in good time for harvest, especially so that the hay could be carted and stacked before the crop was ready for the stripper. The preparation of the soil should receive more consideration than it did at present. Dry seasons had been experienced in the past, and no doubt they would come again, and it was the duty of every farmer to prepare for dry conditions by following the land early, and afterwards working it well to conserve as much moisture as possible. For a number of years sowing the seed under dry conditions had been practically a failure, and, if possible, seeding operations should not be commenced until after rain. Mr. Greig emphasized the importance of proper cultivation of the land, which would greatly assist in the production of good crops. Dry sowing had not been a success of late years. Where wheat was drilled in with fertilisers before rain there was a danger of the fertilisers drawing just sufficient moisture to start the grain, and if rain did not fall soon after the probability was that a proportion of the grain would be spoiled. Mr. Richter would start seeding after the last week in March if the conditions were favorable. It was advisable to make an early start, as by doing so a good crop of straw would generally be obtained, even if the crop did not yield quite so much wheat; and hay was always a valuable asset in this district. It was only in exceptional instances where good results were obtained from dry sowing. Last season he had sown a paddock with Carmichael's Eclipse: 60 acres of it, sown before the rain, had yielded 22 bush. per acre, and 62 acres in the same paddock, put in under moist conditions, had returned 17½ bush. per acre, leaving a gain of 4½ bush. in favor of the dry sown. In another field of 142 acres, 52 acres were sown dry, and yielded 9 bush. per acre, and from the remainder of the paddock, which was drilled in after rain, he had obtained 26 bush. per acre, leaving a margin of 17 bush. per acre in favor of the crop sown soon after the rain. Mr. Jose was not in favor of sowing before rain, as there was a liability on sandy land of the crop being blown away if put in dry. The Chairman would wait for a few days after rain before starting seeding operations, and then get the crop in as soon as possible. Mr. Eagle said his experience went against dry sowing, but farmers should be guided by the conditions of their land and the circumstances in which they were placed. Mr. Johns mentioned that the soil setting together and becoming practically airtight when sown before rain, could be overcome by harrowing such land after rain to loosen the surface, so as to allow the air to penetrate into the soil.

HOMESTEAD MEETING.—Members spent some time inspecting Mr. Greig's homestead. The fine fruit garden was the object of favorable comment.

Redhill, March 19.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. F. Wheaton (chair), J. Pilkington, Lines, Hayes, Trewren, Prevost, B. and E. Steele, Stone, Button, P. H. and F. H. Wheaton (Hon. Sec.), and two visitors.

BARLEY.—The growth of barley on stubble lands, as outlined by Professor Perkins in his address at the Crystal Brook Conference, was discussed. Members generally agreed with the Professor that light soils were best suited for barley-growing. It was thought to be somewhat inferior to wheat and oats as horse feed; and it was questionable whether the growing of large quantities would be profitable, as the prices ruling at present were not likely to hold.

Whyte-Yarcowie, March 4.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Lock (chair), Wittwer, Pearce (two), Hunt, McGregor, Jenkins, Faulkner, Mitchell, Walsh, Jenkins (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—After due consideration of the suggested introduction of the system of selling cattle by live weight, the Branch failed to see that any advantage would result from the change.

Farm Laborers' Blocks.—It was resolved that a better scheme in this regard would be for farmers to erect cottages on their holdings for married men, and allow them the use of a piece of land, say 10 acres in extent.

CO-OPERATIVE PURCHASING FOR FARMERS.—Mr. McGregor read the following paper:—

"There is no class that is imposed upon to such an extent as the farmers when they are buying their agricultural machinery. The reason for this seems to be that farmers are very much inclined to play a lone hand, and they are about the only people following an important industry who do not combine together for their own protection. This is all the more surprising when we know that the farmers are strong enough in numbers and means to command a fair deal in anything they require in connection with the working of their farms. Take, for instance, an article that is becoming very popular, not only with farmers, but many business people as well, namely, a handy-sized motor engine. For an up-to-date engine of, say, five horse power, we are paying, roughly speaking, £100. Now I obtained recently a price list from an American manufacturer. The price quoted for an engine of that power, with latest improvements and five years guarantee, was about £26. The import duty is 25 per cent. on the factory price; the freight I believe is something under £10, so that an engine that we are paying about £100 for could be landed here for about £40. Why should 50 per cent. of the money we pay for an implement be pocketed by people who have nothing to do either with the making or working of it? It is not only on engines we are being overcharged, but we are paying in about the same proportion for our binders, and all other imported machinery. Instead of the local manufacturers selling their machines direct to the farmers, they are sold first to an implement company, to be resold to the farmers at an increase of about 30 per cent. on the maker's price. When we come to think of how we are being overcharged, it seems hardly creditable that we submit to it year after year, when the remedy is absolutely in our own hands. By co-operating the farmers would be in a position to deal directly with manufacturers, thus cutting out middle men and agents. My idea is that the farmers should form local co-operative companies in various centres. There are many different ways they could be worked. I will not attempt to go into details, further than to say that each company should be complete in itself, but at the same time they could work together, so as to be able to place larger orders, and so command a reasonable price. A plan that seems to me a workable one is the formation of co-operative implement factories in a small way to begin with. This would put the farmer in a position to make, buy, or import anything he required. The advantages of such a company are many. It could be easily handled, and would only require a moderate outlay. It is a certainty that the farmers must sooner or later combine, and the sooner the better. It is time the system of buying through agents was done away with. The purchase of super. in bulk lots could also be arranged on the co-operative basis." Members thought that much might be saved in the direction indicated by the paper. One difficulty, however, was to get the farmers to see eye to eye as to the particular make of implement required.

LOWER-NORTH DISTRICT.
(ADELAIDE TO FARRELL'S FLAT.)

Angaston, March 2.

(Average annual rainfall, 21½ in.)

PRESENT.—Messrs. Heggie (chair), Friend, Wishart, Giles, Sibley, Ball, Smith, Stephens, Dr. Cowan, Matthews (Hon. Sec.), and two visitors.

QUESTION BOX.—The meeting took the form of a discussion on a number of matters

raised through the medium of the question box. With the idea of securing a better crop from a shy bearing Royal George peach, members recommended working afresh with a better variety, Elberta, for preference. Under present conditions the majority of members were of opinion that it would not pay to grow apples for export at 3s. per case. For oidium, members thought Bordeaux mixture a more satisfactory spray than sulphur, as it was easier to apply and the results were surer. The likelihood of currant-growing continuing as a profitable industry was thought to depend to a large extent on the support which growers afforded the Dried Fruits Association, and the care exercised in planting the vines. It was agreed that a vineyard of red land with a 9in. subsoil, and a rainfall of 20in., would return best results by being continually cultivated to a depth of 5in. or 6in.

Blyth, February 27.

(Average annual rainfall, 16.28in.)

PRESENT.—Messrs. A. L. McEwin (chair), Dunstone, Zweck, Buzacott, Lehmann, A. A. and J. C. Schulze, Ninnies, Williams, J. S. McEwin, Gell, H. W. and W. O. Eime (Hon. Sec.), and four visitors.

PICKLING SEED WHEAT.—Mr. J. S. McEwin contributed a paper, in which he stated that of the various preparations used for the pickling of seed, viz., bluestone, formalin, and fungisine, the former was the safest, cheapest, and simplest smut preventive. The cost of formalin was nearly double that of bluestone, and the results from its use were in no way better, and in addition when formalin was used it was necessary that the seed should be sown the day following the pickling, otherwise the germination would be hampered. The method of pickling adopted by the writer of the paper was to about three parts fill a 60gall. tub with water, into which 2lbs. of bluestone were placed. The bags of wheat were lifted into the tub by means of a chain running through an eyebolt in the roof, and were allowed to remain in the pickle until the bubbles ceased to rise. It was necessary to use 2lbs. of bluestone for every 10 or 12 bags. In discussing the subject, Mr. A. A. Schulze said he had used both bluestone and fungisine last year, and so far as he could see there was no difference in the result. When dipping the seed he had completely submerged it. He noticed that the mice attacked the wheat pickled with bluestone, but did not touch the fungisine-pickled seed. Mr. O. Eime thought 2lbs. of bluestone to 60galls. of water was insufficient. Members generally agreed that it was advisable to dip bags in a trough when pickling.

Clare, January 26.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. D. M. McKenrie (chair), J. Berridge, F. S. Walker, J. Dux, D. Menzie, F. Pryor, J. H. Knappstein, F. Keane, J. Scales, D. Forbes, A. Dunstan, C. Scott, R. and G. Victorson, H. Mayor, P. Daly, W. Coward, W. Taylor, and P. H. Knappstein (Hon. Sec.).

THE DAIRYING INDUSTRY.—The Government Dairy Expert (Mr. P. H. Suter) delivered a lecture, in the course of which he said—"South Australia could never become a great dairying country. Climatic conditions were against it, although in a few favored spots dairying could be carried on alone very satisfactorily. As a rule, however, the farmer could not do better than go in for mixed farming, and the farmers recognised this. During the last three years dairying, however, had made great progress, and the production of butter had increased very considerably. The weakest spot in the dairying industry of the State was the carelessness and indifference with reference to the breeding of dairy stock. It was one of the cardinal points that more attention should be given to breeding of stock, otherwise dairying could not prove successful. With good sires better stock would be produced and increased returns received. The average return per cow in South Australia was, roughly, about 200lbs., whereas in other States from 300lbs. to 400lbs. were received. It cost as much to keep an indifferent cow as it did to keep a good one. They should be fair to the cows and feed them well, or they would not prove profitable. He advised them to keep none but the best stock, feed them well, keep records of their production, and get rid of the 'scrubbers.' Breeding for dairying and breeding for beef were totally different things, and the feed for beef cattle would perhaps not always suit dairy cattle. He strongly advised the growing of lucerne for food for dairy cattle wherever

practicable, as the best results would be obtained from its use. Pound for pound it was nearly as valuable as bran. He also advocated the feeding of maize, millet, sorghum, and clover, and spoke appreciatively of the use of ensilage, which was one of the best fodders for keeping cattle in good condition. He preferred the Jersey breed for dairying purposes, and also pointed out the merits of Shorthorns, Holsteins, Ayrshires, Guernseys, Danish, and Red Poll cattle. He strongly advised cleanliness in connection with the dairying business, and pointed out instances which had come under his notice where cleanliness had not been observed." Illustrations of the various types of cattle were placed on the screen, and their good points and imperfections were pointed out by the lecturer.

Clare, February 16.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. D. McKenzie (chair), W. Coward, A. Lee, C. Scott, J. Berridge, D. Forbes, F. Pink, J. Dux, A. Pycroft, F. Hicks, P. H. Knappstein (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—The proposal to substitute the system of weighing wheat in bulk for that at present in vogue was duly considered. The following resolution was passed:—"That this Branch advocates the system of weighing wheat by the load, as is practised in New South Wales."

PIGS AND PIG-BREEDING.—The following paper was read by Mr. Hicks:—"The aim of all pig breeders should be to raise a pig with a body that will as nearly as possible fill the four squares of a rectangle in proportion to its size. An animal of this shape is much heavier than the round pig. The square shape gives a much greater proportion of the most valuable parts of the pig, namely, the hams and shoulders. Many people object to the improved breeds because they are too short, but they appear short because they are so broad. A minimum of bone and a maximum of flesh is what is necessary in a profitable pig. In selecting a sow for breeding it need not necessarily be pure-bred, but should have a good dash of Berkshire blood in it. The Poland-China-Berkshire-crossed sow mated with a pure-bred Berkshire boar produces an excellent pig. Sows of this breed are good doers and good mothers, and 12 and 13 are not uncommon litters. The young, if fed fairly well, develop into fair-sized baconers very quickly. I have also tried the Berkshire-Essex-cross. This is a good pig on the first cross, but upon crossing the second time they invariably turn out runts. The most important point in pig-breeding is to select a pure-bred sire (Berkshire for preference). In choosing the sire always look out for the points of a good pig, namely, head wide in front, ears erect and pointed forward, chest wide and rising well to the shoulders, shoulder-blades well sloped backwards, ribs well sprung, loins wide and slightly arched, hind-quarters not sloping or narrow towards the tail, hams well let down and full at the twist, chest wide with elbows well out, fore-ribs wide underneath, flanks well let down and straight, legs straight and small in the bone, hair plentiful, bright, and vigorous. The size, according to the breed, should be medium. Extremes are undesirable." Mr. Forbes did not favor crossing any other breed with the Berkshire, and stated that Berkshire meat and fat were far better than that from any other breed or cross-breed of pigs, as it was not near so flabby. He advocated shutting pigs up, and not letting them roam in paddocks to partly forage for themselves, and stated that the Berkshire was the easiest pig to keep fat, and it ate very little after it was fat. He did not think apples or any fruit were any good at all to feed to pigs, as they were too bulky. It paid better to allow a sow to rear only six or seven young ones in a litter, and to feed them properly. Mr. P. H. Knappstein considered it was best to cross the White Yorkshire with the Berkshire, as that cross made better bacon pigs than the pure Berkshire, and they would also be fit for the market as porkers long before the pure breed. He also advocated allowing pigs to roam and forage in paddocks. They should only be given a little feed in the morning and evening, as he did not think it paid to shut pigs up and feed them on grain. Fruit was sufficient to give them in the morning and evening if they were allowed to roam in the paddocks during the day. Berkshires put condition on too quickly, and so were too heavy and clumsy to roam; and besides they generally had small litters, and it was often the case that they killed half of what they had through rolling on them. Mr. Menzie favored the Berkshire to a certain extent, but thought they put condition on too quickly.

Clara, March 1.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. D. Forbes (chair), J. Dux, F. Keane, T. H. Maynard, J. Scales, A. Pycroft, J. Berridge, B. Lloyd, E. and G. Victorson, and P. H. Knappstein (Hon. Sec.).

WORKSHOPS ON THE FARM.—The following paper was read by Mr. B. Lloyd :—"A well-equipped farm or garden should have a workshop and the necessary outfit and tools for repairing breakages, and doing simple work in connection with blacksmithing and carpentering. Often breakages occur which could be easily and quickly repaired on the place if one had the outfit and tools necessary for the purpose, which otherwise would have to be taken to the tradesman, perhaps some distance away. This means a good deal of expense and loss of time which could be avoided. Besides this, there are simple jobs which could be done on the place during slack time or wet weather, such as making swings and S-hooks, sharpening ploughshares, picks, and other things too numerous to mention, which would mean a considerable amount off the blacksmith's bill during the course of a year. When any implement or machine is finished with for the time it should be brought to the shop, cleaned, put away, repaired, and painted if necessary, ready for use when wanted again. The shop should be large enough to enable the implements to be brought in for overhauling and repairing, and should be well lighted, and fitted up conveniently for doing the work. The carpenter's bench and tools could be at one end, and the blacksmith's outfit at the other. The shop should have shelves and racks fitted around the walls in which to put the tools. Each tool should have its place, and should be always kept in its place, so that it could be found when required. The outfit and tools most necessary are a forge with either bellows or fan-blast, anvil, vice, blacksmith's drill, tongs, hammer, sledge, hot and cold chisels, set of shoeing tools, punches, &c. The most useful carpenter's tools are a handsaw, wood chisel, claw hammer, mallet, spirit-level, brace and bits, bradawl, square, jack, smoothing planes, and a draw-knife. A few bars of the most useful flat and round iron should be kept on hand. It is a good idea to have a scrap iron heap close to the shop, as there is a lot of good and useful iron in out-of-date and worn out implements which can be made use of at the forge. A good supply of assorted bolts and nuts, wire nails, screws, and rivets should always be handy, and the shop should be kept locked." In the discussion which followed, Mr. Pink said it was a good idea to have a scrap iron heap near the shop. Mr. Maynard stated that it meant a great saving to have a workshop. The producer must not expect to turn out a piece of work like a tradesman, but he could always fix up breakages temporarily until the busy time was over. Mr. P. H. Knappstein thought it would be a good idea for any one having a workshop to get a blacksmith to do a few weeks' work every year in the slack time mending breakages, &c., and not have to take the implements that required attention into the nearest township. Any man ought to be able to make his own S-hooks and eye-bolts that would suit his purpose if he had the tools.

Freeling, March 1.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. F. H. Heinrich (chair), G. T. Elix, M. Shanahan, H. Koch, J. A. Mattiske, Neindorf, Nelder, Harvey, and S. Nairn, of the Stockport Branch.

FIELD TRIAL.—It was decided that a field trial should be held under the auspices of the Branch, and a committee to make arrangements was duly appointed.

SHEEP ON THE FARM.—The following paper was read by Mr. S. Nairn :—"I would like it plainly understood that I am recommending the keeping of sheep on a farm as a by-product, and not as the main source of income. Australia is peculiarly adapted for the raising of sheep, our mild climate making housing and artificial feeding unnecessary. Even in New Zealand, with its reputation for fat lambs, I have been told on good authority that lambs have to be weaned and fattened on rape or some such crop. With us we can produce prime lambs straight off the ewes. The lambs should be ready in about six months, providing they have had anything like a fair show. Allowing for an 80 per cent. lambing, and 10s. per head for lambs, the sheep will produce 8s. per head for lambs. Allow 4s. per head for wool, and it will work out at 12s. per head, or £60 for every 100 sheep. The amount of fertility the sheep convey to the soil must not be overlooked. The greatest problem that faces the world to-day is the possibility of the soil becoming so thoroughly wheat sick that it will refuse to produce the grain on which we all depend so much. The scientist and the chemist have given us superphosphate, which has no doubt tided off the evil day. One great law of nature is that nothing shall be lost, and

the waste of the animal becomes food for the plant, and the plant food for the animal. If we assist the laws of nature, the more feed that is consumed from the land the more fitted the land becomes to produce feed. There is scarcely a weed growing that sheep will not pick down, even if they do not kill it out altogether. The consolidating of the soil is an important indirect gain from the sheep, and on the rich, black land at Freeling it would be a great advantage to have the fallow tramped firm and solid in this manner."

Mallala, March 4.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. J. Nairn (chair), S. Marshman, R. C. East, J. L. Curnow, S. J. Temby, F. M. Worden, W. McCabe, T. H. Worden (Hon. Sec.), and one visitor.

SELECTION OF SEED WHEAT.—The following paper was read by Mr. W. McCabe:—"The most important point connected with the production of wheat and other crops is the selection of the seed. Seed that suits one class of land may not suit another; therefore we must look for that which best suits the different classes of land. Try to get seed from the farmer who has land similar to yours, and whose crop returned the highest average. Sowing cracked and shrivelled grain is waste. It interferes with the evenness of sowing. For getting the wheat clean and the grain even the grader is to be recommended. Barley is a nuisance in the wheat at present; it helps the yield, but does not improve the look of the crop. The best way to get barley out is to pick it just when it comes out in ear. As the barley is generally ahead of the wheat, it can then be seen easily. We shall always have barley in our wheats while there is barley in the hay. After getting wheats that suit our land, we can improve on them if we pick out a few of the best heads, as near alike as we can find, and sow and reap them separately from the main crop. Before reaping the strip if we pick out the best heads again, and keep on breeding from them, we would always have good seed. It is advisable to change seed with some reliable farmer in a different locality every two or three years, as a change improves the wheat and keeps it from deteriorating. Sow about 70 lbs. of clean seed to the acre with the 7 in. drill, as then a thick crop will cover the ground and keep the weeds in check. Give a dressing of about 150 lbs. of super. to the acre. If the seed is free from smut it should not require pickling, unless the ground is very damp, when it is advisable to treat the seed with about 1 lb. of bluestone to 4 galls. of water in a cask that holds about 80 galls. of the solution, with the aid of a perforated cylinder that fits inside of the cask, such as McCabe's patent pickler. With this, one can pickle about 10 bags an hour by pouring half a bag at a time through the solution. It should be pulled up immediately, so that the grain is only washed. The longer it is left in the solution the more likely is the germination to be affected."

Nantawarra, February 29.

(Average annual rainfall, 15 in.)

PRESENT.—Messrs. R. P. Uppill (chair), T. Dixon, A. F. Herbert, J. Nicholls, S. Sleep, W. Smith, F. Sutton, J. Sinclair, E. J. Herbert, G. L. Tucker (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—The proposed substitution of the system of weighing wheat in bulk for that at present in vogue was discussed. Members expressed the view that if the scales were regularly tested the present system was satisfactory.

Northfield, March 5.

(Average annual rainfall, 19 in.)

PRESENT.—Messrs. Rowe (chair), Goldney, Westphal, Thompson, McCauley, and Mitchell (Hon. Sec.).

HARNESSES.—In the absence of the writer (Mr. Roeger) the following paper was read by the Hon. Secretary:—"Harness is a very expensive item, but this expense may be

greatly curtailed by taking care of the harness from the moment it is purchased. When a person buys new harness he takes great care of it while it is new, but as soon as the newness is worn off, little thought is given to it. Collars, saddles, and bridles are sometimes thrown into corners and left there till again wanted; consequently, before long they break and wear out. Instead of a set of harness lasting something like 10 years to 20 years, it is worn out in from two years to four years. First of all it is advisable to purchase nothing but the very best, as it will prove the cheapest in the long run. By securing second rate or second class harness cheaply you more than pay the extra that you would pay for the best in repairs, or else by discarding it years sooner and having to make a fresh outlay. Users of harness should procure a bottle of neatsfoot oil, and a few tins of Ford's harness composition, and give the harness a dressing of the oil and composition three or four times a year. This will keep it clean and pliable. A great deal of saving may be effected by paying proper attention, at the right time, to repairs. There are many repairs to which a handy man should attend himself, by keeping a saddler's outfit, such as a ball of hemp, a few awls and needles, a piece of cobbler's wax, a good assortment of copper rivets, and a clamp, which may be made out of two pieces of stringy bark about 2½ in. by ½ in., fastened with three screws at the centre. The draught of the collar and the hames should come well above the point of the shoulder. Inattention to this point is to a large extent the cause of horses jibbing and sore shoulders. Nothing but leather-lined pipe collars should be used, as the leather can very easily be kept clean, whereas with the check lining the dirt, salt, and hair are held, and upon the horse sweating these cause the lining to become hard and lumpy; and if it is not cleaned after use each time it will finally raise sores on the shoulder. Steel collars, although strong and lasting and easily kept clean, are very injurious to the shoulder of the horse. I have always found it advisable to keep a separate collar for each horse, and not one collar for two or three different horses, as this tends to alter the shape, thus making it a bad fit for all of them. When purchasing a collar it is advantageous to have it fitting somewhat tight, and before using soak it in water for five or six hours. It will then be found to pull into the required shape easily." In discussing the subject, Mr. Westphal stated that the adjustment of the hames was an important factor. Sore shoulders were often occasioned by the carelessness of the driver in spite of a well-fitting collar. He preferred leather lining to the collars. Mr. Goldney used only pipe collars, and favored check lining. Well-fitting collars were frequently pulled out of shape by straight hames. Mr. McCauley objected to the use of neatsfoot oil. Tallow, lard, nugget, and kindred dressings would keep the leather in better heart.

Salisbury, February 6.

(Average annual rainfall, 18.45 in.)

PRESENT.—Messrs. Moss (chair), Sayers, John, E. V., A. J., and A. H. Harvey, Bagster, Bussenschutt, Sexton, McGlashan, Short, James, Shepherdson, Illman, Neal, Hooper, and Jenkins (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—After duly considering the suggested introduction of the system of selling cattle by live weight, members decided that the present method was satisfactory, and there was no need for the change.

Farm Laborers' Blocks.—The Branch considered the proposal that the Government should survey small blocks in new hundreds for the purpose of providing farm laborers with holdings. It was thought that there was no necessity for this action.

WHEAT AND HAY YIELDS.—Mr. Bussenschutt initiated a discussion on various matters connected with the harvest. He had found King's Early a good hay wheat, but it went down badly. This variety did best when sown late in May. Gallant's Hybrid was also a good wheat for hay. He considered that if the seed was sown on the surface of the ground with the manure in a dry seeding time, and then harrowed over, a better plant would result. He had drilled in 1 cwt. of manure per acre before seeding and another 1 cwt. at seeding time, and the return fully warranted the extra dressing. Members generally considered that in view of the stiff nature of the soils in the district it was not advisable to work them too fine—if they were kept open better results would follow. Considering the light rainfall of the season, the crops were especially good; but it was doubted whether, in the event of there being another dry season, the average would be so good, as there would be very little moisture in the fallow.

WESTERN DISTRICT.

Coorabee, March 3.

(Average annual rainfall about 12in.)

PRESENT.—Messrs. Riddle (chair), Hobbs, Gregor, Cousins, Woodforde, Wheadon, and two visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in bulk.—Members favored the proposal to introduce the system of weighing wheat in bulk where large quantities of grain were to be dealt with.

Selling Cattle by Live Weight.—The proposal to introduce the system of selling cattle by live weight was discussed, and members decided to afford it their support.

Farm Laborers' Blocks.—The suggestion that the Government should survey small blocks in new hundreds for the purpose of providing holdings for farm laborers was thought by members to be unworkable.

Elbow Hill, March 2.

(Average annual rainfall, 11.78 in.)

PRESENT.—Messrs. Cooper (chair), Dunn, Rehn, Jacobs, Freeth, and Wake (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—A lengthy discussion on the proposed introduction of the system of selling cattle by live weight took place. The majority of members failed to see that any good results would accrue; others thought it would be an advantage to the person who had had little experience in judging the weight of cattle.

Farm Laborers' Blocks.—The proposal that the Government should survey small blocks in new hundreds to provide holdings for farm laborers did not meet with members' favor. It was thought undesirable that a laborer working on a farm should live off the place; the farmer should build a house for his man. Mr. Dunn stated that working men in this district who had held blocks in their own names had disposed of them.

MANURIAL TESTS.—Mr. F. Rehn had been conducting tests with the idea of ascertaining the value of manure applied in different quantities. He had four plots of fallow land, each four acres in extent, the treatment and results being as follows:—

Plot.	Manure.	Seed. Lbs.	Variety.	Result. Bush. Lbs.
1.	80lbs. Wallaroo super	45	Gluyas	15 30
2.	80lbs. special	45	"	17 32
3.	No manure	45	"	15 31
4.	40lbs. manure	45	"	15 30

The most noticeable feature of the test was that the wheat grown on the unmanured plot, No. 3, did not possess nearly as much straw as the others.

Koppio, March 14.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. G. Howard (chair), G. B., G. R., and M. T. Gardner (Hon. Sec.), and three visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. G. Howard. Members inspected the orchard, which included over 1,000 fruit trees and 600 vines. It was rather late in the season to see the trees at their best, more especially as they were generally too young to bear heavily. During last year Mr. Howard had dressed two rows of vines with special orchard manure at the rate of about 1cwt. to the acre. Those vines that had received the manure were carrying a very much heavier crop than the others. Some peach trees also had been dressed with about 6lbs. of special manure per tree, and showed a much more vigorous growth and heavier crop of fruit than the unmanured trees. Last August Mr. Howard planted 400 trees, and 99 per cent. were thriving.

Miltalie, March 2.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. E. P. Smith (chair), W. G. Smith, Ramsey, P. G. and A. M. Wilson, T. W. and E. Storey, F., J. S., and B. Jacobs, G. Brooks, W. E. Heir (Hon. Sec.), and two visitors.

SUITABLE WHEATS FOR DISTRICT.—A discussion on this subject was initiated by Mr. P. J. Wilson reading a paper on "Selection of Seed," which had been written by Mr. J. Spencer, of the Clarendon Branch, and printed on page 772 of the February issue of the *Journal*. Mr. Wilson thought that farmers should try different varieties of wheat. He had found that Yandilla King, Marshall's No. 3, and Comeback were good wheats, but Gluyas was better. Other members had tried Golden Drop and found it good; but generally members were in favor of Gluyas as the best all-round wheat for this district. In reply to a question as to which wheat would best stand feeding down, Mr. Jacobs said he was not in favor of feeding down any wheat, but Gluyas would stand it best if it was to be done. Members generally agreed on this point. Mr. T. A. Wilson had tried bearded Gluyas last year. He had sown 2 bush. of seed on three acres, and had reaped 18 bags, which was a good return for the season. He thought three-quarters of a bushel to the acre was quite sufficient. He had seen lightly-sown crops turn out well. Mr. F. Jacobs thought a fairly liberal sowing was preferable. Mr. C. Searle last year had experimented with different quantities, and had found that three-quarters of a bushel to the acre had yielded the best return. It was resolved that each member should set aside plots of five acres, to be sown simultaneously, with equal quantities of manure, but with 40 lbs. and 60 lbs. of seed respectively.

Utera Plains, March 2.

(Average annual rainfall, 14 in.)

PRESENT.—Messrs. A. Ramsey, A. and C. Venning, W. Gale, W. Stevens, J. and M. Abrook, F. Braunack, T. C. Hornhardt, G. and A. Barber, W. Lee, H. G. Hornhardt, G. C. Bilney, M. Hunt, R. Hill (Hon. Sec.), and four visitors.

CAMPBELL SCRUB RAKE.—Mr. C. L. Venning contributed a paper, in which he pointed out that where it was a practice to drill in new ground before ploughing, the use of the scrub rake was advisable. In low mallee and bush, where a good burn could not be obtained, it was very useful. It would handle sticks up to 7 ft. in length. The lifting device for emptying the rake was an excellent one. Three horses were quite sufficient draught for ordinary country, and where the ground was hard two steady horses would suffice. Members generally agreed that the implement was of use when it was necessary to deal with small mallee.

Yadnarie, March 2.

PRESENT.—Messrs. C. B. Schubert (chair), J. H. Marston, J. A. and E. Kruger, J. A., C., and F. Dreckow, A. Jericho, A. Spriggs, W. Brown, R. B. Deer, R. Parbes, J. J. Deer (Hon. Sec.), and five visitors.

FARMING IN MALLEE COUNTRY.—The following paper was read by Mr. Kruger:—"The first essential in farming in new country is the water supply. I prefer well water; but if it is not possible to obtain this, tanks should be put down where there are good runs. Scrub should be rolled down where possible, but if it is too big some axe work will have to be done. A house and stables should be erected near the centre of the block. The former should be of stone, and the latter of iron. The stables and chaff shed should be on a gentle slope, and drainage should run to the east. A tank for drinking water should be placed at one end. All buildings should be put up neatly from the start. Before burning scrub the timber should be thrown in from a strip about half a chain wide, all rubbish cleared off, and a belt ploughed right round the rolled portion. A day with a good hot wind should be selected on which to burn the scrub. As soon as the land is cleared ploughing could be commenced with a Linke & Noack patent disc plough. For seeding use the Sun disc drill. Drill in 45 lbs. to 50 lbs. of well graded seed per acre, and about 50 lbs. to 60 lbs. of super. A plot of oats as well as wheat would be of considerable value for hay. After seeding, fencing should be attended to. Where obtainable, teatree posts should be put

not less than 18in. in the ground, and from 12ft. to 15ft. apart, with a strainer at each twentieth post. Netting should be 3ft. 6in. wide, and put well into the ground. A No. 8 galvanized plain wire is best to attach to the top of the netting. This, with a barbed wire on top of the posts, makes a very effective fence. Paddocks should not be larger than 200 acres each. They should be as near to the homestead as possible to facilitate the removal of stock from one to another. The Sunshine harvester is the best, as it does not need so much labor. With the ordinary stripper, however, you could save all the chaff." Members agreed that it was essential to curtail expenses as much as possible when commencing farming operations. Where there was clay it was preferable to scoop dams rather than to rely on tanks for water.

PLOUGHING IN NEW LAND.—Members unanimously considered the mouldboard plough better than the disc for new country, as although it did not cut the shoots so well, it assisted very materially in clearing the land of stumps.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Forster, March 2.

(Average annual rainfall, 10½in.)

PRESENT.—Messrs. C. Hayman (chair), J. G. Whitfield, J. and T. Searle, and W. Sears (Hon. Sec.).

FARMING IN SCRUB COUNTRY.—Mr. J. Searle read a paper on this subject, in which he pointed out that it was advisable when commencing operations in new country to clear as great an area as possible for cropping the first year. A few head of poultry should be a source of profit, but cows should not be kept until the required feed and water were available. Horses should be purchased young. All feed required should be grown on the place, and fruit and vegetables for household use should be raised wherever possible. It was bad policy to purchase on credit. Care should be taken of the cocky chaff, as this was valuable in seasons of scarcity. Mr. Whitfield suggested that more poultry could with advantage be kept, and foals were profitable. Mr. T. Searle thought it inadvisable to keep fowls, on account of foxes. He would keep cattle, and Mr. Hayman said brood mares would be more remunerative.

Geranium, March 2.

PRESENT.—Messrs. W. Mitchell (chair), Lang, Leahy, Wendlebourne, Dohnt, A. J. and I. J. Mitchell, Jacob, Reed, Norton, Lang, Charlton, Hammond (two), Pannell (Hon. Sec.), and three visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—After considerable discussion it was decided that the Branch should support the proposal to introduce the system of weighing wheat in bulk.

PROSPECTS.—Members expressed the greatest confidence in this portion of the Pinnaroo district as a wheat-producing area. Although the weather conditions prevailing at last harvest were unfortunately unfavorable, the country was undoubtedly good.

Geranium, March 24.

PRESENT.—Messrs. W. Mitchell (chair), I. J. and W. J. Mitchell, F. and W. Hammond, E. Wendlebourne, J. Bowden, Lang, Lithgow, Norton, Blatchford, Leahy, Dohnt, Pannell (Hon. Sec.), and two visitors.

MALLEE FARMING PROBLEMS.—Mr. E. Blatchford dealt with various matters in a paper, in which he said that no hard and fast rule could be laid down for the regulation of agri-

cultural operations. Every farmer should know the nature of his own particular holding, and even when that was so it would be found that a certain thing done in a workmanlike manner one season would probably prove a great success and the following year an utter failure, even though performed with equal care. In the matter of stubble-burning, he would not do it immediately after harvest, but preferred the latter end of February, because of the fact that the sap of the mallee roots did not recede till the end of March, and if the stubble was burnt too early it would be found that the shoots would sprout again slightly. Fallowing should be done early, and he contended that when stinkwort and other such rubbish got a hold in the district they would be of the greatest benefit to farmers, because they would be compelled to work their fallows well to keep the weeds in check, and also to do it after the rains caused the germination of the rubbish, which was nature's correct time. Many other departments of work were touched on and freely discussed. Mr. D. Leahy would burn his stubble as early as possible, as he considered the free action of the sun on the land for the first two or three years, while it was yet somewhat sour, had a beneficial effect which more than counteracted the results of a few second-growth shoots.

Lameroo, March 2.

(Average annual rainfall, 16in.

PRESENT.—Messrs. E. J. Trowbridge (chair), Leckie, Thyer, W. J. Trowbridge, Jericho, Blum, Wray, C. R. and F. W. Eime, Gibbon, Cameron, Koch (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Weighing Wheat in Bulk.—Due consideration was given the proposal to substitute the system of weighing wheat in bulk for that at present in vogue. Members thought the change would be an improvement, and decided to afford it their support.

Farm Laborers' Blocks.—The suggestion that the Government should survey small holdings for farm laborers in new hundreds was discussed. Members decided to support the proposal.

IMMIGRATION OF FARM LABORERS.—The following paper was read by Mr. A. J. A. Koch (Hon. Secretary) at the previous meeting:—"To deal thoroughly with the immigration of farm hands will always be a hard matter. While permanent employment can always be found for tradesmen of all descriptions, the same cannot be said with regard to farm hands. With carpenters and other tradesmen their work is the same, whether they are engaged in Australia or any other part of the world. When once the technical part is mastered it is only slightly altered to work in with local conditions. An English farm hand is, however, faced with an altogether different problem. He finds that his several years of farm life in England will not stand him in much stead. He may be able to drive a wagon team, or harness horses, but as far as his knowledge of modern Australian implements is concerned, he would certainly have to start at the bottom of the ladder and work his way up. Farmers in different localities have so many different ways of doing the same work that a man should be thoroughly well used to farming in several localities before he could claim to be a practical farm hand. Could we be sure of getting good, reliable men, those who are willing and able to learn, who know how to go about their work, we would have plenty of employment for them. Those who are immigrating to Australia at present are most ambitious. They have heard casually that a high rate of wages is procurable here, and expect same immediately on arrival. They should be content to take a lower rate of wages until they became thoroughly acquainted with their new surroundings. Usually when an employer sees a man trying to get on he will give every encouragement, and raise his wages from time to time as he progresses in his work. No employer cares to see a man do his work in a dilatory manner, and the more energy he displays the more will his services be appreciated. Our Government is asking each applicant for a farm laborer to deposit the sum of £4 with the immigration officer, to partly pay the passage of the person applied for. But they have made no provision whereby the farmer can get the amount back from his man on his arrival. This seems to most people unfair, although we know that the Government is losing in each case about £14 or £16. Should an employé be unsuitable, there is no means whatever of the employer being recompensed for the expense he has incurred, and the next man will gain it because he gets his man by engaging him locally. It is good to hear the optimistic remarks of our newcomers, but they should not be led to believe that all is milk and honey. They,

like others, will have their times of disappointment. Many difficulties must be overcome by them, but when once thoroughly used to our general conditions they should make as good colonists as did their forefathers, who helped to build this country to its present state of prosperity." Reference was made to the fact that many immigrants who engaged as farm hands were incompetent. Mr. Ross thought good men could afford to pay their own way, and that assisted immigrants were not worth much.

Parrakie, March 20.

(Average annual rainfall about 16in.)

PRESENT.—Messrs. F. J. Dayman (chair), A. J. Beelitz, O. Heinzel, W. Threadgold, F. W. Randall, R. F. Brinkley, M. F. Lee, F. W. Gravestocks, J. Temby, T. Lewis, N. G. Good, C. E. Hammond, F. S. Dayman, W. Bastian, H. Deiner (Hon. Sec.), and two visitors.

CARE OF MACHINERY.—The following paper was read by Mr. N. G. Good :—"The care of farm machinery is a matter that is often neglected. How often, on going on a farm, do you see machinery of all kinds standing about totally unprotected from the weather; and especially is this the case on farms in newly-settled districts. This is a very big mistake, and one that can be easily rectified. Building stone sheds for our machinery is too expensive. A shed with an iron roof, with the sides built up neatly with stumps, will keep the rain off the machinery. All the woodwork of the machinery should be well painted. Every farmer can do this himself with very little cost. If we were to paint it every two years it would be in a lot better order. Small repairs should always be attended to immediately after you have finished working the machine. Thoroughly overhaul and clean off all oil and grease as soon as possible. Note what things are worn out; you can get these fittings and put them on during inclement weather." In discussing the paper members said it was a good plan to look over the machine every morning before commencing work to ascertain whether any bolts had been lost, or nuts worked loose. Stone walls were preferable for machinery sheds, and Mr. Lee considered stumps were dangerous on account of fire. He had his machinery overhauled and painted by the blacksmith every year. Mr. O. Heinzel had used old super. bags sewn together to make sides for his sheds.

FARMING IN PARRAKIE DISTRICT.—Mr. C. E. Hammond read a short paper in which he expressed the view that a farmer with one team of horses should sow not more than 250 acres yearly. This area should be fallowed and worked well—in the first place ploughed with the share plough, then harrowed (after the stumps had been picked up), and following this worked back with a heavy disc. About 50 acres could be cut for hay, and the balance reaped. Cows and fowls could be kept to assist in swelling the income, and a few pigs would also be a source of profit." Mr. Bastian agreed with the views of the writer of the paper. He had tried to grow lucerne last year, but his efforts were not attended by success. Messrs. Dayman and Good would only fallow and sow 200 acres with wheat, and would put in oats on 50 acres of stubble. Mr. Temby did not think it advisable to use a share plough. The fallow would be best worked back with a disc. The Hon. Secretary said the harrows were not used nearly enough in the district. Harrowing twice after rain did the land more good than one cultivation with any other implement. Members agreed that it was absolutely essential to secure a good burn in order to grow wheat in this district.

Waikerie, February 24.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. C. Burroughs (chair), J. Jones, F. G. Rogers, E. J. Burton, A. Lewis, S. Modestach, J. J. Odgers, (Hon. Sec.) and two visitors.

QUESTIONS FROM CONGRESS FOR OPINION.—

Farm Laborers' Blocks.—The suggestion that the Government should survey small blocks in new hundreds for the purpose of providing holdings for farm laborers was duly discussed. Members decided not to support the idea.

TWO-HEADED WHEAT.—Mr. E. J. Burton tabled a sample of Federation wheat in the ear, possessing two heads on each stalk. He stated that he had several patches of wheat in his crop which showed the same peculiarity.

Waikerie, March 11.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. J. C. Rowe (chair), F. G. Rogers, E. J. Buxton, W. J. Green, and J. J. Odgers (Hon. Sec.).

RACK-DRYING CURRANTS AND LEXIAS.—Mr. Rogers briefly described the method of drying currants on wire netting racks. The usual practice, he said, was to use rough timber, the ordinary posts being 5½ ft. out of the ground. There were four rows of 2in. mesh netting 4ft. wide, the wire used being 11½ Neptune. The racks were then covered with hessian. He pointed out that on one occasion, after a ½ in. fall of rain, it was found that the water had dripped off the racks, and the currants were much dryer than those on the trays. Galvanized iron was a suitable material for roofing. Members were unanimously of opinion that rack drying was an improved method, was labor saving, and less costly in so far as material was concerned. Mr. Rowe thought the galvanized-iron roof would interfere with the drying of the Gordos. He tabled a sample of raisins dried in one week, which were a beautiful color. The fruit had been placed 4in. thick on the racks.

Wilkawatt, March 2.

PRESENT.—Messrs. J. Ivett (chair), H. M. Harvey, D. F. Bowman, H. F. and O. Ahms, J. W. and F. W. Altus, E. W. and H. Brooker, C. Schulze, T. Sorrell, A. J. McAvaney, J. O'Shea, M. Hayes, W. J. Tyler (Hon. Sec.), and five visitors.

BLACKSMITHING ON THE FARM.—The following paper was read by the Hon. Secretary:—
 "This subject appears to me to be one of the avoided items in connection with farming, and yet more money could be saved by having a small blacksmith shop on the farm than in any other way. Why there are not more blacksmith's shops on farms is not because the farmers think themselves incapable of doing the work, but because they think the expenses of a plant are too heavy. But that is not the case, and a very fair set of tools can be bought for £7. It should be the aim of every farmer to possess a small set of tools. How many times have we seen wire substituted for bolts or fractures? Of course wire is very handy, but just consider the life of the machines. Where you have wire bracing up a fracture there must be friction, and in time wear, and perhaps later on another breakage, which could be obviated by five minutes spent in the blacksmith shop threading a bolt or bending a stay. I will endeavor to give some idea as to the costs of different tools which are essential to do the work. First comes the forge. For ordinary farm use the portable forge is quite good enough. It will work iron satisfactorily up to nearly 2in. Above that the local smith shop is the best place to get the work done. Although I have had 5in. rock drills sharpened in my forge, I do not think it pays to do these large jobs in the small forge: too much coal is used. The forge will cost about £2 7s. 6d. My reason for advocating the portable forge is that it can be moved about as wanted, and in fact can be carted to the machine. A 1cwt. anvil is quite heavy enough. Then there is the vice; 4in. jaws will be sufficient, and should cost about 18s. Small tools, consisting of an anvil cutter (3s.), and three pairs of tongs at 9s., are necessary. There are, of course, dozens of tools, such as top swages and swage block, one can buy if one has the cash to lay out. A swage block is far more handy than a lot of bottom swages, as they are apt to get lost, and probably cost more in the long run. A swage block costs about £1 per cwt., and a 1cwt. block is quite large enough for small work. A hack saw should be on every farm, apart from the blacksmith shop, as it saves a lot of hard work with the hammer and chisel. A 10in. saw is a very handy size, and costs about 3s., the saws being about 4s. per dozen. I have not mentioned the hammer, because every farmer has a hammer of some sort. A light slogging hammer is useful also. For drawing out iron it is necessary to get it to a good white heat, and then proceed to weld the point and draw out as though a square piece of iron was wanted. If a round iron is required it can be rounded off after it has been drawn out. The same heat is necessary for bending. I have seen farmers trying to draw out iron when it was a dull red color, but after a few blows the iron split and was of little use. After a little practice in making S hooks and such small jobs, a man will soon see what heats are best for working. I should like to suggest that the Advisory Board invite an expert blacksmith to write a detailed account of the process of working iron for the benefit of producers who are on the lookout for information of this kind. I believe the *Victorian Journal* is printing some thing of this kind. It would prove very interesting to almost every farmer."

SOUTH AND HILLS DISTRICT.

Cherry Gardens, February 27.

(Average annual rainfall, 35.3in.)

PRESENT.—Messrs. H. Jacobs (chair), T. Jacobs, Arno Jacobs, Tom Jacobs, jun., C. Lewis, H. Lewis, J. Lewis, G. Hicks, J. Tozer, and S. H. Curnow (Hon. Sec.).

EXHIBITS.—Mr. Arno Jacobs tabled some plums, the name of the variety being unknown to members, and the Hon. Secretary tabled samples of King David apple.

EARLY AUTUMN.—Mr. T. Jacobs drew attention to the abnormally early autumn. Many of the fruit trees were already denuded of all foliage. He was afraid that there were other causes than the long, dry spell. He knew of trees that were growing in moist situations that were also bare. In some cases the apple trees had more fruit than leaves. Drier years than this had been experienced, but he had never seen the trees looking so bad. Mr. Arno Jacobs said the drought was undoubtedly the cause of the trouble. He had noticed that the late fruit more particularly was suffering. The early kinds, where the crops had been gathered before the heat wave, were not affected nearly so badly as the later kinds. The Hon. Secretary thought the long, hot, dry summer was the cause of the whole trouble. Mr. J. Lewis attributed it to the heat wave. Mr. Hicks said he always had his best fruit on the hill sides, as the clay was nearer the surface.

WASTE PRODUCTS.—Mr. T. Jacob initiated a discussion on the subject of the utilisation of waste products. There was always much about a farm or home that could be termed "waste," and with attention and a little care much of this could be utilised to good purpose. Windfall apples were usually fed to the pigs, and this was worse than waste. This year many apples were wasted over and above those fed to pigs, and these and the others could have been better utilised. A splendid vinegar was to be made from apples, and enormous quantities could be so utilised. It should not be necessary for anyone in an apple district to buy vinegar, as he believed it would pay one to purchase cheap apples to make this article. Generally the tops of potatoes were used to cover the tubers when dug, and they were afterwards wasted. People did not seem to realise their splendid feeding qualities, especially to milch cows. He always fed the tops to his cows, and he knew that it paid him handsomely. One of his neighbors had a happy knack of turning out all manner of useful kitchen utensils, such as cake and blanc mange tins, and patty pans, from old kerosine tins, and also used them for swinging baskets for plants, &c. He stated that Mr. Molineux had once said that where many fowls were kept, and children were plentiful, it would pay to gather up the waste feathers about the hen yard, and it was quite likely that such was the case. Mr. A. Jacobs mentioned that Captain Hill, of Scotts Creek, always boiled the waste apples with a little bran and molasses, and when so treated they made a splendid fodder for cows. Mr. C. Lewis disagreed with Mr. Jacobs when he said that it was worse than waste to feed apples to pigs. Last year he had fattened seven or eight pigs on apples. They had been fed entirely on this fruit for two months.

ROPE MACHINE.—Mr. S. H. Curnow had constructed a rope machine, and he gave a practical illustration on the making of rope from waste binder twine, afterwards explaining the construction of the machine, which was simple and easily made.

Hartley, March 2.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), Hudd, Pratt, Richardson, Tydemann, Hill, G. and T. Phillips, Burns, and Birmingham (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Farm Laborers' Blocks.—The proposal that the Government should survey small blocks in new hundreds for the purpose of providing holdings for farm laborers was discussed at length. Members thought that, unless the blocks were very small, the laborer would be engaged working his own land when most required by the farmer. The better scheme was for the employer to erect a cottage for the laborer, and allow him paddocking for one or two cows.

HARVEST.—The harvest was reported as not being so good as last year, the season having been too dry. Federation, on the whole, had been the highest yielding wheat, although in a few instances it was almost a complete failure. Yandilla King also yielded well. Land that had been fallowed in most places returned good crops of about from 15bush.

to 22bush., but in most instances, where the land had not been fallowed the crops were failures. The Chairman had a good crop of King's Early from seed which he had obtained from the Roseworthy Agricultural College, but rough weather had militated against a heavy yield. Huguenot and Tuscan were considered the best wheats for hay. Most members favored the former, as it consisted of a solid straw, and stock were very fond of it, even if it was very coarse through being grown on heavy flat land.

Ironbank, March 1.

PRESENT.—Messrs. C. Morgan (chair), W. Slater, C. Coats, E. Coats, W. Dalton, G. L. Coats, G. Pole, W. Coats (Hon. Sec.), and two visitors.

STRAWBERRY CULTURE.—The following paper was read by Mr. Chas. Morgan :—
 "To grow strawberries to advantage one must see that the ground is suitably situated, and also that it has a good clay subsoil. A piece of ground lying well to the south, facing the north, with a slight incline to the west should if possible be selected. All scrub should first be knocked down and left until it is dry enough to burn well. By burning one got a certain amount of potash, which is very desirable for growing strawberries. The best way to prepare the soil is to grub it up to a fair depth and leave it to sweeten until the following year. This will enable you, as soon as the first rains come, to grub your ground the second time, or to plough to a depth of two furrows. I prefer the grubbing, as this mixes the soil better and leaves the bottom rough, which will be found more suitable than a smooth bottom. Your ground will need to be broken to a depth of from 18in. to 2ft. The deeper and finer it is the better it will hold the moisture. After this it will need to be gone over with a forked hoe, to break up all lumps or clods that may be left on the surface. When you have got the bed smooth bonedust should be spread at the rate of from 20cwt. to 30cwt. per acre. Dig this in with new forks, to put the manure well down. The bushes will be deeply rooted, and able to withstand a hot dry summer if this is done."

Kanmantoo, January 27.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. W. Downing (chair), W. G. Mills, J. Shepherd, A. Hay, H. Pym, H. R. Downing, S. and R. Crotchley, R. Talbot, E. Shepherd, A. Mills, and W. Mills (Hon. Sec.).

DESTRUCTION OF RABBITS.—The following papers were read by Messrs. R. Talbot and A. Mills respectively :—
 "Rabbits in this district are a great pest because they breed so fast. The best means of destroying them in the summer time is to go around the paddock with a grubbing-axe and shovel and chop in all the holes with the grubbing-axe and throw the loose sand that the rabbits have dug out on to the top of the hole, so that the rabbits when they push out will not be able to get back without some trouble, because the sand being dry and loose, will run in after the rabbits have passed out. Where the pests are thick, lay poison at the same time as, or even before, you fill up the burrows. Where they are not very thick, I prefer shooting them; but at this time of the year the skins will not pay for the trouble. A good way, where there is a large warren, is to put a wire-netting fence around it. Leave no burrows outside that are connected with the ones inside, or the rabbits will get out; then put down poison. In the winter, when the ground is wet, the best method of rabbit destruction is trapping. As you pick up the traps you must fill in the holes well; and to make a good job, put the traps on top after you have filled the holes. Where you have only a few burrows dig them out and level them off smoothly. In ground that is rough, some prefer leaving the burrows open after they are dug out." "First of all, if possible, rabbits should be kept out. To do this we will have to wire net paddocks of about 500 acres, keeping the rough country divided from the arable, for we know it is almost an impossible task to kill rabbits where it is rough. Keep an eye on fences every fortnight or two, for creeks dry up this time of the year, and in soft country rabbits dig under. On some large estates where the country is clear they use a bullock team and an old plough to smother the pest and destroy the holes, and where it is watered by dams and waterholes they fence off stock and poison the water, or else put double netting round so that the rabbits can get in but not out. In this way they get thousands in a single night. Where this cannot be done, it is advisable to kill the rabbits when they are thinnest. This is at mating time. You can then catch them with traps, keeping as many good dogs as you can muster to catch loose ones, or otherwise you can shoot them. When winter sets in is the proper time to dig out, the ground being

soft. This is an expensive, but the best method if you have time to spare. When digging out clear the dirt right out and finish the hole to the end so that they will not have a place in which to start again. Use carbon bi-sulphide in a Suddeth machine. This acts very well until the end of spring, when the ground gets hard and cracked. Two men will use $\frac{1}{2}$ gall. or more in one day where holes are plentiful. After filling in holes well and digging shallow openings out, set traps on top of large burrows to catch outsiders, as they will open holes almost immediately. Destroy hollow logs and such harbors. When feed gets dry is the proper time to lay poison, and, if possible, lay after rain, as the ground is fresh and the poison does not get so dirty. Mix poison well, so that fire is not likely to occur. S.A.P. by itself is not strong enough, so add one-quarter of a stick of phosphorus well dissolved in a pint of boiling water, putting in a cup of honey and one of brown sugar, each dissolved in a pint of water. Add nine pints of water and mix this with the pollard. Lay poison in small pieces not too close together. Make plenty of tracks—this keeps one rabbit from getting too much. Drop baits around all water, and where rabbits are plentiful place rings around all holes. If there is any over, put it out on buck heaps and such places. Three or four days later fill in the holes. This smothers them in sandy country in hot weather." It was decided to request the District Councils of Monarto and Nairne to enforce the destruction of rabbits. Mr. A. Hay mentioned that his efforts to poison rabbits with wheat had been very successful. He mixed one tin of S.A.P. with 10lbs. of brown sugar and just enough water to dissolve the sugar. Into this was mixed $1\frac{1}{2}$ bush. of wheat and enough pollard to dry the whole.

Kanmantoo, March 2.

(Average annual rainfall, 17in.)

PRESENT.—MESSE. Hay, Talbot, Wooley, Shepherd, Downing, Critchley, A. Mills, and W. Mills (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Farm Laborers' Blocks.—Members considered at length the proposal that the Government should survey small blocks in new hundreds for the purpose of providing holdings for farm laborers. The scheme was thought to be unworkable. Unless the blocks were of a size sufficient to enable the holders to make a living from them they would take the first opportunity of disposing of them, and if they were of such a size the holders would spend their time working the holdings, and the object of the scheme would be defeated.

WOOLCLASSING AND ROLLING.—Mr. Henshaw Jackson, the Wool Instructor, delivered a lecture on the classing of farmers' clips, and with the aid of a few fleeces, illustrated his remarks. It was decided to form a class in the district for the purpose of securing a course of lectures by the Wool Instructor, and 15 intimated their intention of joining.

Longwood, February 24.

(Average annual rainfall, 37in.)

PRESENT.—MESSRS. W. H. Hughes (chair), E. J. Oinn, C. J. Blackley, W. and J. Nicholls, E. H. Glyde, H. Vogel, J. Roebuck, A. F. Furniss, J. R. Coles (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. A. Furniss. The packing-sheds were inspected, and the party then proceeded to visit the orchard. Apple trees, which were last year transplanted from a rich flat to the side of a hill, gave promise of satisfactory growth, despite the fact that they were 14 years old when removed. A large Winter Nellis pear tree, which until this season had failed to bear, had produced a very heavy crop. Last pruning season the centre branch of the tree had been cut out, to which fact this year's excellent crop was attributed. Mr. Furniss stated that he had added lime to the manure used for potatoes, with the result that the yield was much benefited.

MYLOR TYPE ORCHARD.—On the 17th February members of the Branch visited the Government Orchard at Mylor. The President, in reporting on the visit, stated that the land on which the orchard was planted was typical of many thousands of acres in the hills, and the educational value of the work done there was considerable. It was thought that the export value of some of the varieties should be ascertained.

Meadows, March 10.

(Average annual rainfall, 34½ in.)

PRESENT.—Messrs. G. Ellis (chair), J. Stone, S. Smith, W. J. Stone, G. T. Griggs (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—The homestead of Mr. T. Griggs, Prospect Hill, was inspected by members, who evinced considerable interest in the orchards, paddocks, and the drying of apples and currants on slate slabs placed in the sun. The process of drying under this method could be completed in one day, provided the weather conditions were suitable. The smoke and bacon-curing houses were inspected, and ensilage pits, and an 8-horse-power Blackstone oil engine used for driving the chaffcutter, circular saw, and corncrusher were noted. Mr. Griggs exhibited a large stack of sawn timber of locally-grown stringy bark and pine, from which he made up his own fruit cases for export; also an engine for pumping water for irrigating purposes. Mr. Griggs was exporting and drying a large quantity of apples this year. His young orchard, planted on scrub land which he had cleared, was looking remarkably well, the trees being very healthy and almost free from blight and other leaf pests. The King David variety of apple was bearing well this year. Mr. Griggs informed the members that he had got good results by grafting early apples on late varieties.

Mount Barker, February 29.

PRESENT.—Messrs. H. N. Bell (chair), Bert Pope, C. Crompton, D. N. Wollaston, J. Little, J. Brinkley, A. Ferguson, J. Cleggett, Friend Simper, P. Davis, Geo. Cleggett, J. Choat, F. Treleven, J. G. Thomas, R. H. Grimes, Joe Pope, J. Hender, J. Morris, E. Schmidtke, W. Pearson, B. Fidler, J. E. Smith, P. F. Liebelt, C. Liebelt, C. Braendler, S. J. Bishop, A. P. Herbertson, B. Blades, J. Cornish, H. Jones, L. Cornish, and F. Virgo (Hon. Sec.).

EXHIBIT.—Mr. J. Thomas tabled an exhibit of maize, which had grown to a height of 10ft. without rain since November.

GREEN FODDERS.—Mr. Pearson read the following paper:—"From the dairyman's point of view this is a very important subject, as a continuous supply of green feed through the whole year is an absolute necessity if the best results are to be obtained from the cows. It is my intention to treat the subject in this paper from the dairyming and not from a grazier's standpoint. Of course, the main object to be kept in view is a continuous supply. Everyone knows how disastrous it is to the milk yield if the supply of green feed fails even for one week in the middle of summer. Cows will fall off in yield from one-third to a half in a few days. No matter how liberal the ration supplied afterwards, the loss is absolute, and will never be recovered. The question is, how can a continuous supply of green fodder be obtained? Of course, the ever varying conditions of soil and climate, rainfall, &c., render it impossible to prescribe a course that would be suitable for all. Consequently much must be left to the judgment of the dairyman. To start the season from, say, the middle of March, I recommend for winter feed to sow about one-third or one-quarter of the area available with rye and the remainder with barley, for the following reasons:—Rye will be ready to cut two or three weeks earlier than barley. Again, barley is much sweeter and softer than rye. Cows will eat rye when it is young, and as it grows very quickly it is wise to sow some to start with. This crop, given timely rains, should be available by June, and should last in this or any cool district till October or even November, as a second cut of barley is often obtained, provided it is not cut too close to the ground at first. The scythe should be set so that it does not cut within 1½ in. of the ground. I have invariably noticed where a crop has been swept off quite close to the ground there is no second growth. Consequently it is good policy to leave an inch or more of the first cut on the ground to secure a second crop. Mangolds should be sown in August or September, just according to the condition of the land, which is really more important than the date, and should be considered first every time. By the time the barley is done a lot of feed should be secured by picking the leaves and thinning out the crop to about 4 in. to 6 in. apart, and in another month they should be thinned to about a foot apart. If the growth is vigorous it is surprising what a lot of feed it will yield, and given a showery summer a continuous supply of leaves all the season should be available. The characteristic of the mangold that renders it so valuable is that it can be drawn on for 12 months, as the plants continue to grow until the following September, when they can be drawn and clamped, and will

keep up to Christmas if just covered with straw or any other material to keep off the sun. They improve by keeping, as the water evaporates and leaves them better and sweeter. Mixed with pollard, there is no better food for breeding sows whilst suckling their young. Of course, there is almost an endless variety of summer crops that can be grown; such as maize, sorghum, amber cane, different kinds of millet, and beet. Taking all things into consideration maize cannot be improved on for a summer crop. In the first place it produces the largest amount of fodder, although possibly there is not much to choose between it and some other members of the same family. I do not consider maize by itself to be a great milk producer, as I have always found when changing from mangolds or lucerne to it the yield from my cows fell off fully one-third in a few days (fed on it alone), but I always obtained satisfactory results when I chaffed it. My method was to chaff and mix about a kerosine bucket full of pollard to (say) three bags of chaff and let it lie and sweat for from 12 to 24 hours, and I am quite sure that if you are not satisfied with the quantity of milk they give you will be more than satisfied with the quantity of maize they eat. It is more suitable for chaff when the cobs are hardening and it is getting too hard to be eaten without chaffing. I presume the merits of lucerne are too well and widely known to need much discussion here, as there is no doubt but that, given fair conditions and an absence of its natural enemies—such as dodder and fleas—lucerne must be given pride of place, and is justly termed the king of fodders. It thrives best in a nice free, deep, rich soil, with water from 3ft. to 6ft. from the surface, but does well sometimes in stiff, heavy clay if sufficiently moist, and may be cut from four to six times a year. It should always be cut as close and clean as possible. In my dairying experience, by carrying out the above suggestions I have never found any difficulty in keeping up a supply of green fodder all the year. It goes without saying that the quantity grown must be determined by the number of cows to be fed. In most instances there is considerable overlapping of various kinds of feed, but I would like here to emphasize the fact that the chief value of mangolds lies in the fact that they are available practically the whole of the year, whilst other fodders must be used or harvested when ready. It will be noticed that I have not dealt with the mode of cultivation of the various fodders referred to. My reason is that I consider it would not be possible to do justice to such a large subject in conjunction with another. If satisfactory results are to be obtained the following rules should be observed in all cases:—Thorough cultivation, liberal dressing with manure, and last but not least, thoroughly drained land. The crop also should be kept as free from weeds as possible." An interesting discussion followed the reading of the paper. Mr. Simper asked what variety of mangolds the writer preferred? Mr. Pearson—For poor soil, Globe. Mr. Simper preferred long yellow, because they had less root. Mr. C. B. Pope preferred half sugar; he found they yielded better, and were best for cows. Mr. J. G. Thomas differed from Mr. Pearson's remarks regarding lucerne; he found that lucerne could be harvested and stacked, but was doubtful about chaffing maize on account of it steaming, and his experience was that hot feed increased wind in animals. Mr. Pearson said his object had been to show how a continuous supply of green fodder could be raised without resorting to ensilage. Mr. Fidler asked whether the loss of milk was absolute when the cows were deprived of the green fodder? Mr. Pearson—Yes; the cow may recover partially, but never to its original quantity of milk. Mr. Joe Pope agreed that rye and barley were good crops for early feed, but would advocate oats and wheat; he found that rye and barley were too tough, and that after a very short time the cattle would not eat them—if there was too much oats and wheat it could be allowed to ripen and made into hay. Mr. Cornish preferred rye and barley for the first crop; rye could be cut three times, and after that turned under and oats planted; rye was a dry feed, and helped to prevent scour in cattle. Mr. Geo. Cleggett had no faith in rye; barley made a good cow hay, and was eaten before wheaten hay; he preferred barley to wheat, but it should be cut when just in ear. Mr. Thomas desired to know the best time to feed cows on maize, before the cobs appeared or after? Mr. Pearson—Before, as it is more nutritious. Mr. Geo. Cleggett said that as the result of feeding cows when the cob was forming they gave 1 gall. of milk more each day than when the cob was dry. Mr. Fidler asked whether lucerne should be grown without irrigation? Mr. Pearson—No; unless water is from 3ft. to 6ft. from the surface.

Mount Barker, March 28.

PRESENT.—Messrs. H. N. Bell (chair), F. Trelevan, C. B. Pope, A. W. Howard, J. Little, H. Jones, J. Morris, A. Fergusson, B. Barker, H. Trelevan, G. Cleggett, J. Cleggett, C. Crompton, J. B. Paech, J. Brinkley, J. Choat, P. Fox, P. Davis, F. Follett, J. G. Thomas,

A. P. Herberherson, Dr. M. Scott, S. J. Bishop, L. A. and A. P. Cornish, D. L. G. Monfries, Joe Pope, F. Simper, B. Fidler, J. E. Smith, A. B. Blades, D. N. Wollastan, Fred. Virgo (Hon. Sec.), and one visitor.

TRIFOLIUM SUBTERRANEUM.—The following paper was read by Mr. A. W. Howard:—
 “Until a few years ago subterranean trefoil was known only as a very insignificant weed, indigenous to Europe. Since its introduction to Australia it is proving to be one of the most valuable grazing plants. I will divide fodder plants into three main classes, so that, if necessary, comparisons may be more readily made as to their various requirements and merits. The first division will include the brassica family chiefly, as the kales, swedes, cabbage, chou moellier, rape, &c. Mangolds, although belonging to a different order, may be grouped with the above, as they require similar cultivation. The whole of these plants are gross feeders, and require rich soils and heavy manuring to render them a success. The second division embraces bladed plants, grasses, &c., as rye, prairie grass, and cocksfoot for soils of medium quality, and the sorghums, millets, maize, &c., which succeed only in soils of a richer quality. The third division embraces leguminous plants, as peas, beans, lentils, tares, lucerne, clovers, and trefoils. Included in this family of plants are some of the most valuable fodders known, not perhaps on account of great bulk of crop, but on account of the rich feeding qualities they possess, and the fact of their ability to absorb much nitrogen from the atmosphere which they deposit by the aid of root nodules in the soil. Lucerne is pre-eminent among the legumes, and is deservedly called the king of fodders. There can be no gainsaying the fact, that given depth of soil, facilities for irrigation, and systematic manuring, more produce can be taken from an acre of lucerne than of any other plant known, and this with feeding qualities of the highest order. I mention this plant particularly, as I wish to compare it with the trefoil, which is the subject of this paper. Subterranean is the descriptive name given to the trefoil under notice. It is applied to it on account of the peculiar manner in which the pods with the stalks, soon after the fertilisation of the flowers has taken place, depart from an erect position and turning over rest the crowns of the burrs or flower heads upon the soil; these, during the process of developing and ripening, insert themselves in the soil. In the case of very hard surfaces the seed head has difficulty in penetrating; but wherever the plant grows, there some pods will be found buried. Now, it is this peculiarity of burying its pods that is the chief recommendation of the plant. If it were not done, so fond are live stock of every part of it, that, carrying its seed above ground, it would, unless protected like grain crops, quickly be exterminated. Now, although this plant is merely an annual, yet the heaviest stocking makes no difference to the succeeding season's crop, as each autumn the buried seeds, after the first good rain, will, in the course of 10 days, clothe the surface with its green cotyledons, or seed leaves. Some years ago—as you will see in one of the letters printed at the time—I came to the conclusion that this capacity of burying its seeds would render the trefoil very valuable as a permanent pasture plant, and this has proved correct, as the same land produces as good feed as it did 18 years ago. Now, previous to the introduction of this plant it was difficult in the best seasons to keep cattle in good condition, but since its advent it takes but little time to fatten them. It is interesting to note that this particular trefoil is the only plant known to agriculture that ripens its seed beneath the surface; indeed, but one or two other plants in the whole range of nature are known to do so. Up to the time of which I was just now speaking, subterranean trefoil was a plant unknown to agriculturists in any part of the world. It could not be found in any catalogue of agricultural seed; neither had it in any way been brought to the notice of farmers. The question was, what was its descriptive name. It seemed strange that a plant so valuable in fattening properties, and on fair soils producing such masses of succulent stems, could be overlooked by scientific agriculturists; but such was the case, and at last it was found in Smith's and Sowerby's works on English botany. These authors have plates of it, which represent it as a diminutive weed found in odd places, growing in poor gravelly and sandy soils. Sowerby, whose books are to be seen in the Adelaide Library, gives its French name, viz., *Trèfle souterrain*, from which we may infer that it is indigenous to France as well as to Britain. Those botanists would be somewhat surprised could they see their insignificant English weed growing as we in South Australia often see it, closely together, unown by man, each plant producing numerous stems, some plants measuring 5ft. across, the stems lying one over the other to a depth of 6in. with the foliage rising another 6in. or 7in. We have now traced the origin of our trefoil, and there is no doubt it was introduced here with other agricultural seeds from Britain. In discussing the merits of fodder plants, as with everything else, it is only fair to calculate the cost or deduct the cost of cultivation from the returns. On this point some growers would be surprised if they carefully ascertained results how little profit they make, and others might be surprised at their making as much

as they do. Manuring, tilling, irrigation, and the cost of cutting and carting, and feeding to stock always absorbs a large proportion of the profits, so that whatever can be introduced in the way of a fodder that will reduce expenses is a great advantage. My claim for subterranean trefoil is that, considering the little expense attached to its production, and its value as food for stock of any kind, whether green or dry, it stands in advance of anything else that can be grown on soils of any quality. It succeeds well where lucerne, paspalum, or maize would refuse to grow; and to crown all, when once sown, whether in land occasionally cultivated or on permanent grass pastures, there it will remain for all time without resewing. Such a statement can be made of no other plant at present. It is gradually creeping up our barren hillsides, and horses and cattle may be seen all through the summer eating the dry stems and unburiad seed pods, where previously they would have died from starvation. Several years ago I sent packets of seeds gratis to people living in each Australian State, to New Zealand, and South Africa, and after a lengthy trial, which has proved its merits, I have applications for more than I have saved. We have growing around us here in Mount Barker one of the most extraordinary plants known, and if this is not its birthplace it is from this district that it was first introduced to agriculture and commerce. Let me mention here that this trefoil, as with others of the legume family, supplies its own nitrogen, which it absorbs from the atmosphere and stores up in the nodules upon the roots; thus, instead of exhausting the soil of this valuable constituent it enriches it. My experience with this plant has taught me that if a luxuriant crop is desired a little super. drilled on the surface every few years will secure it. It is a great pleasure to see this trefoil spreading along our creeks and gullies, as it is not often that really good things are so persistent and hardy. In fact, most plants that spread so readily are amongst the most noxious known, as many Australians know to their cost." In reply to questions, Mr. Howard said that this clover encouraged the growths of other grasses. He had tried English clover, and it had grown splendidly in rich flats, but it would only last for five years. No matter how poor the soil the subterranean clover would grow. After a fire had passed over the land a heavy crop of new plants would grow. He had seen the clover, which had been under water for six weeks, and it was growing well. Messrs. Joe Pope and J. Choat found that clover did destroy the other grasses. Mr. Monfries had grown red clover 2ft. 6in. high, and it had lasted seven years. Mr. J. E. Smith had tried red clover and found it to grow quite well, and it lasted quite a number of years. Mr. H. Jones had red clover growing, and while it would last for 10 years it would not seed.

Mount Pleasant, March 8.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. H. A. Giles (chair), F. Thomson, P. Miller, V. Tapscott, and D. C. Maxwell (Hon. Sec.).

RABBIT DESTRUCTION.—The Chairman said there was a great diversity of opinion as to the best means of destroying rabbits. He contended that, provided it was properly carried out, poisoning with phosphorised pollard was most effective. He had no doubt that fires were sometimes caused by phosphorus; but if it was properly mixed it would not fire. One of the main points in mixing was to have the proper proportions of pollard and phosphorus. He had seen many reports of the loss of stock through eating dead rabbits, but if the proportion of phosphorus was great enough the rabbits would die in their burrows, and so there was no danger in that way. The Hon. Secretary agreed with Mr. Giles that poisoning was the quickest and easiest method in poor country, or country surrounded by unoccupied land: but in good country he did not favor poisoning. People put too much confidence in its efficacy, and usually did very little to follow it up by killing the rabbits which were not poisoned. Mr. Thomson explained some of the difficulties which the district councils had to face in the matter, and thought the Rabbit Destruction Act should be enforced in good country.

EARLY GREEN FEED.—A discussion took place as to the best means of securing early green feed for stock. Mr. Miller thought one of the essential factors was to have the ground thoroughly ploughed to a good depth, and he considered that it was useless putting in the seed unless the ground was well ploughed. He favored sowing rye, with a small proportion of oats or barley, for a first cut; and a patch of barley to follow on.

SOUTH-EAST DISTRICT.

Naracoorte, February 10.

(Average annual rainfall, 22in.)

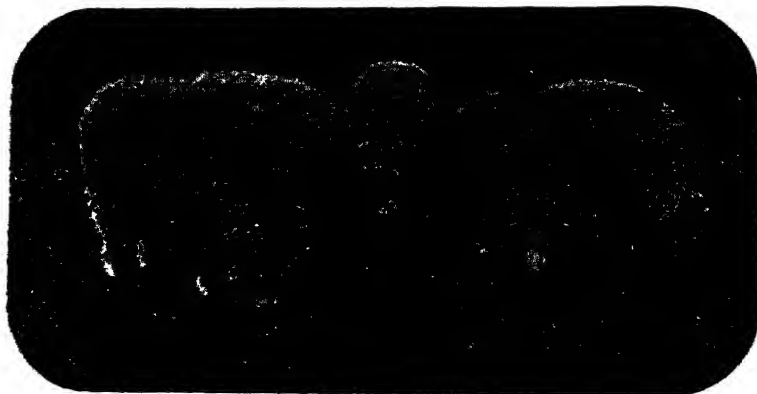
PRESENT.—Messrs. L. Wright (chair), W. Rogers, W. Loller, A. Langeludecke, jun., E. Coe, A. Caldwell, J. M. Wray, and S. H. Schinckel (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—The suggested substitution of the system of selling cattle by live weight for that at present in operation was considered. Mr. W. Loller thought that the plan should be adopted as a matter of justice between man and man. It would tend to more correct dealing, and any plan that would do that should be favored. He recognised that it would not be practicable in small places, but where practicable it should be done. Other speakers pointed out that it would necessitate the establishment of weighbridges and yards, and that it would mean an expense to be borne by the seller. It was also pointed out that the weight alone would not determine the price, as the quality of the beast for meat would have to be taken into consideration, and when cattle were bought and sold under the present system the weight and quality were taken into consideration. The quality of a beast could only be judged by appearance, and therefore there would still remain a large element of speculation in purchasing by live weight. The voting was against the proposal.

Weighing Wheat in Bulk.—The majority of members favored the adoption of the system of weighing wheat in bulk, as it was thought that a saving of time would be effected, less handling would be entailed, and a waste of grain would be obviated.

Farm Laborers' Blocks.—The suggestion that the Government should survey small blocks in new hundreds to provide holdings for farm laborers was considered a good one, and the Branch decided to afford it their support.



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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

North Bundaleer Estate.

The desire for land in good agricultural districts is evidenced by the number of applicants for portions of the North Bundaleer Estate which was recently purchased by the Government for closer settlement purposes. For the 54 blocks there were applications from 472 persons, the majority of whom indicated several that would suit them. Block 710, for which there were 195 applicants, was the most desired, and other holdings particularly favored were 251 (117 applicants), 252 (101), 254 (120), 255 (102), and 257 (110). The names of those to whom the various blocks were allotted is as follows:—

Section 247—Allottee, Coon, A. D., 585 acres. 248—Smith, A. and P. J., 735. 249—Burgess, T. G., 435. 250—Stephens, A. V. and H. H., 471½. 251—Pearce, Charles, 394½. 252—Cronin, M. J., and Lambert, A., 443. 253—Steele, A. L., 661. 254—Searle, E. L. and W. T., 515½. 255—Keatley, W. R. and G., 545½. 256—Anesburg, C. E., 636. 257—Shadforth, W. H., 411½. 258—Smart, P. H., and C. E., 444½. 259—Sanders, F. G., 1,031. 260—Wood, A. E. and H. E., 426. 261—Price, S., 682. 262—Dundon, M. P. and J., 465. 263—Heithersay, H. G., 346½. 264—Scriven, J., 391. 265—Stone, S. T., 385. 266—Burton, J. L. and A. P., 418½. 267—Wilson, W., and O'Dea, T., 769. 268—Kelly, P. F. and R. P., 864. 269—Neill, P. R., 817½. 270—Fitzpatrick, Mrs. M., 4½. 271—Walsh, T., 305. 272—Bishop, G. and J., 400. 273, 277, 278—Jones, A. B., 401½. 274—Moloney, J. P., 129. 275—McCarthy, M. J., 134. 276—Callahan, M., D., and M., 167. 279—Cadzow, T. C., 328. 280—Hunt, K. D. and C. W., 595½. 281—Maher, M. H., 518½. 696—Cooper, E. S., 146. 697—Dick, James, 149½. 698—Barry, W. P., 136. 699—Cook, W. and F. E., 139. 700—Dempsey, T. A., 138. 701—Lawrie, J. and H. R. O., 165. 702—Giles, F. C., 202. 703—Daly, S. and J. D., 199½. 704—Hogan, P. and J., 252. 705—Forth, J. H., 156. 706—O'Dea, M., 159. 707—Jones, W. H. and E. C., 202½. 708 and 709—Ellis, S. H., 397½. 710—Case, Isaac P., 442. 711—Siegert, F. W., 544. 712—Kelly, John, jun., 487. 713—Hening, C. F. A., jun., 479. 714—Toholke, A. J., 472½.

Dairy Herd Testing.

The New Zealand Department of Agriculture has published the following letter from a dairy-farmer in the Dominion:—"At the end of the season after I started testing I was surprised to find how little I knew about my cows. This was illustrated by a choice of my eight best cows which I made at the

department's request at the beginning of the first testing season. I picked good cows, but not the best, as one of the eight I picked gave only 290lbs. of butter-fat for the season; and yet I had in my herd sixty-two cows which gave over this quantity. One cow in the herd was not selected, although up to the end of the season (July) she was the best cow in the herd, and produced over 507lbs. of butter-fat. The average yield of 17 best cows was 9,907lbs. of milk and 418lbs. of fat; the average yield of 17 cull cows was 5,290lbs. of milk and 183lbs. of fat; the average of the herd of 117 cows and heifers was 7,647lbs. of milk and 295lbs. of fat; the average of the herd (without those culled out) was 8,064lbs. milk and 315lbs. fat. For years I have been milking some cows which, as the result of testing, have now been culled out. Two particular cows were milked for seven years, and though fairly good cows, are now discarded. Had I had my herd tested seven years ago and culled out these 17 cows and replaced them with others equal to the average of my herd, my savings would be figured somewhat as follows:—The average cow without the culls gave 315lbs. fat; the average cow of those culled gave 183lbs. fat; the difference is 132lbs. of fat per cow for one year. For 17 cows for one year, this loss of butter-fat would amount to 2,244lbs., which at an average price of 1s. per pound, equals £112 4s. For seven years it would amount to £785 8s."

Amount of Rain Needed to Produce a Payable Wheat Crop.

Dealing with the results obtained on farmers' experimental plots in the southern district of New South Wales last season, Mr. H. Ross, Inspector of Agriculture, writes in the April *Agricultural Gazette of New South Wales*:—"Regarding the number of inches of rain needed for the production of a payable crop, some valuable lessons have been learned during the past season. Generally farmers contend that from 10in. to 12in. are essential during the growing period of the crop. That, however, good crops can be grown with a far less rainfall than that, has been clearly demonstrated by some of the experiments. In the experiment plot (about 10 acres) at Wyalong the total rainfall from the time the seed was sown until the crop was harvested was 668 points. The yield of the plots went as high as 24bush. per acre. At Jindera (Albury), with a rainfall of 752 points, an average yield of 22½bush. per acre was obtained, and Federation went as high as 28bush. 56lbs. per acre. More remarkable still are the results from the Deniliquin plots, which were sown on the 1st and 2nd of May. In this case the total rainfall amounted to only 322 points, distributed as follows:—May, 210 points; June, 60 points; July, 12 points; August, nil; September, 37 points; October, 3 points; November, nil. Still the payable yield of 14bush. per acre resulted. In every one of these instances the land was fallowed and worked with culti-

vators and harrows so as to leave a loose, dry mulch on the surface. A large amount of the previous year's rainfall was thus stored and conserved in the soil, so that practically two years' rainfall was employed in the production of one crop. Surely such results should leave no further doubt in any farmer's mind as to the necessity for thoroughly working his fallowed land."

New Artificial Manure.

The British Acting Consul at Christiana (Mr. H. C. Dick) reports, on the authority of the local press, the production of a new artificial manure, "biphosphate," as a result of experiments at the Notodden Nitrate Works. The new fertiliser is a by-product of the nitrate of lime produced at these works, and is obtained without affecting the quantity of nitrate produced. Apatite or other raw materials are dissolved in the nitric acid, and are then submitted to further treatment. The experiments have been carried out with apatite from the Bamle apatite mines. It is stated that the biphosphate should prove very valuable as an artificial manure for replacing both the superphosphate hitherto in use and Thomas phosphate. It is added that it will probably be possible to place this manure on the market at a low price.—*Board of Trade Journal.*

Irrigation in United States.

According to the census figures for 1910, the amount invested in irrigation works in the United States was approximately £60,500,000. Dividing this sum by the total acreage irrigated gives £4 11s. 8d. as the average price per acre of irrigation works such as reservoirs and main canals. This, however, does not include the expenses incurred by the farmer in installing head ditches and laterals and preparing his lands for irrigation. These expenditures would easily average another £4 3s. 4d. per acre, raising the total to £8 15s. per acre, and making a grand total of approximately £120,000,000 of capital invested.—*Pacific Rural Press.*

Cost of Working Fertilised Land.

At a large meeting of farmers recently held at Peak Hill, N.S.W., an estimate was prepared and adopted regarding the cost of working fertilised land. The estimate was as follows:—Price of freehold land £6 per acre, interest thereon for two years at 5 per cent. 12s., cost of ploughing and fallowing per acre 6s., harrowing 1s., disc cultivating 2s. 9d., one spring-tooth cultivating 2s., drilling 2s. 3d., manure 2s. 6d., seed wheat 2s. 6d., harvesting 7s., wheat-

carting, 5s., bags 3s. 3d. The total cost of putting in and taking off is £2 6s. 3d. per acre. The estimated yield per acre is put down at 21bush. at 3s. 3d., a return per acre of £3 8s. 3d., which leaves a profit of £1 2s. per acre. Allowance, of course, will have to be made on the above for depreciation of plant, horses, &c.—*The Pastoralists' Review*.

Should Starlings be Protected?

The question whether starlings should be protected or not has been occupying the attention of the Agricultural Boards of Tasmania. In view of the fact that Tasmania is such a large fruit-growing country, it is somewhat surprising that (according to the reports in the March number of the *Agricultural Gazette*) the general opinion of the members of the various boards is that any damage the starling may do to fruit is more than compensated by the good it does in the destruction of insects and other pests.

Bacterial Black Spot of Walnut.

Growers of walnuts in the Mount Lofty Ranges, whose trees have been attacked by a disease similar to that mentioned, will be interested in the following paragraph by Mr. L. Rodway, Government Botanist of Tasmania, taken from the *Agricultural Gazette* of that State:—"Many of the walnut trees about Hobart are becoming badly attacked by bacterial black spot. It appears as small black spots on the surface of both nut and leaf. This spot soon spreads, till an ugly black patch appears. The leaf is soon rendered incapable of carrying out its normal function, and dies. The disease spreads over the greater part of the nut, gradually invading the deeper portions and effectually destroying the kernel. A tree when badly attacked soon becomes weakened, and if the disease is not checked, dies in a few years. Whether death occurs through the parasite gaining ingress to the trunk is not proved, but there seems every probability this is not so, but death is caused from the injurious effect produced in the foliage. The disease is caused by a minute oblong bacterium that carries a single flagellum at one end. It appears to always start on the surface; that is, there is a new infection each year. For some time the parasite remains in the superficial layers, forming colonies of bacteria between the cells of the host; only after the vitality is much reduced does it appear to spread deeper. Where this disease has appeared in our gardens it seems to get worse every season, till the crop at last is destroyed. It is very probable that consistent spraying with Bordeaux will greatly reduce the attack; also, where it is slight and people value their trees, all infected parts should be removed and burnt."

Victorian Barley Yield.

The Government Statist of Victoria has issued his estimate of the barley yield of that State for last season. The total area under crop was 53,541 acres, or an increase of 884 acres. The yield was 1,024,584bush., of which 725,803bush. were of malting varieties. Malting barley gave an average yield per acre of 19.75bush, and other sorts 17.79bush. In the previous seasons the respective averages were 26.30bush. and 24.25bush. A comparison for the past seven years is given below:—

	Malting. bush.	Other. bush.	Total. bush.
1905-6	645,456	416,683	1,062,139
1906-7	674,043	581,399	1,255,442
1907-8	747,315	311,980	1,059,295
1908-9	1,013,384	497,797	1,611,181
1909-10	655,105	365,279	1,023,384
1910-11	804,893	535,494	1,340,387
1911-12	725,803	298,781	1,024,584

New South Wales Wheat Crop.

The revised official estimate of the New South Wales wheat crop has been issued by the Government Statist. This places the yield at 24,616,100bush., or about 1,250,000bush. more than was forecasted in December. The harvest this year is 3,297,447bush. less than in 1911, when 27,913,547bush. were reaped.

Butter and Cheese Production in California.

During the year ended September 30th, 1911, there were produced in California 50,380,736lbs. of butter, 4,580,495lbs. of cheese, 8,820,310lbs. of evaporated milk, and 2,091,300lbs. of casein. For the two preceding years the production of butter was 35,989,141lbs. and 43,899,018lbs. respectively. The cheese production has remained practically stationary.

Milk with "Cowy" Flavor.

Milk will not taste of the cow unless dirt from the outside of the cow obtains access to it, as the typical "cowy" flavor cannot develop inside the udder. This was shown at a pure milk exhibition once. Three kinds of milk were provided for the visitors to taste and to pass judgment on for quality. The first was as nearly clean as possible, the second had a trace of cow manure

added to it, and the third had more than a trace. More than two-thirds of the visitors decided in favor of the third sample, for it had the typical "cowy" flavor that they had been accustomed to in years gone by.—*Pacific Rural Press*.

The Cobdogla Irrigation Scheme.

A well-written article relating to Lake Barmera, which appeared in the Renmark *Pioneer* of April 19th, contains some interesting information as to the Cobdogla Irrigation Settlement, which is now under survey. The possibilities of irrigation, says the writer, in South Australia are no longer in doubt. The Government is committed to the establishment of a chain of irrigation settlements along the river, which it is anticipated—not without good reason—will result in the addition of many thousands of producers to the population of the State. And in this chain of settlements Cobdogla—as the Lake Barmera scheme is called—promises to be a particularly bright gem. Water for irrigation will be lifted from the lake, and not, as in the case of all other settlements so far established, from the river. The heights to which water must be raised are much less than those required at Waikerie and Berri. Both at Waikerie and Berri water is lifted more than 120ft. above the river. At Cobdogla, it is estimated 5,000 acres can be irrigated with a 40ft. lift, and a total of 15,000 acres by means of a lift of less than 90ft. The Berri channels, as a matter of fact, could be made to command the Cobdogla land; and the two settlements, when fully developed, will probably meet and merge.

What is the Bull's Value?

The true value of the bull (says the *Stockbreeder*) can only be measured in his offspring. It is a common saying that the bull is half the herd. The exact value of a bull represented in money would indeed be hard to determine, but it is quite evident, when he is a prepotent animal, that he is truly half the herd, and sometimes more. It is, of course, in many cases not an easy matter to learn just what his offspring are doing, but it is entirely possible among registered animals to trace them up. Unless the daughters of a bull and his get have been tested and production records made, there is no way of telling what his offspring has done or is doing, and thus the value of keeping milk and butter fat records is shown; not only to indicate what the cows are doing towards making a profit, but to show through them what the sire can do.

Agricultural Bureau.

Considerable activity has recently been shown in the formation of branches of the Agricultural Bureau at various centres. It is proposed in a future issue to give the number of branches formed during the last 12 months and particulars of membership, &c. Reference will also be made to the question of the time fixed by law when stubble may be burnt, which was recently discussed by the Advisory Board of Agriculture.

Imports and Exports of Plants.

During the month of April 3,169bush. of fresh fruits, 3,071 bags of potatoes, 604 bags of onions, and 63pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 86bush. of bananas (chiefly overripe) were rejected. Under the Federal Commerce Act 76,290 cases of fresh fruits, 103pkgs. of preserved fruit, and 2,271pkgs. of dried fruit were exported to oversea markets during the same period. These were distributed as follows:—For London, 43,874 cases apples, 1,250 cases pears, 1,216pkgs. dried fruit, 8pkgs. preserved fruit, and 3 cases quinces; for Germany, 26,718 cases apples, 420 cases pears, and 13pkgs. quinces, also 55pkgs. honey; for New Zealand, 15 cases apples, 115 cases lemons, 804 cases grapes, and 1,055pkgs. dried fruit, also 17pkgs. seed; for India and East, 3,079 cases apples, 2 cases pears, 95pkgs. preserved fruit, and 230 cases grapes. Under the Federal Quarantine Act 3,263pkgs. plants, seeds, &c., were admitted from oversea sources.

The Advantages of Irrigation.

Mr. S. Fortier, Chief of Irrigation Investigations, U.S.A., writes:—"Unlike mining, which has unearthed countless millions by the toil of the many but has allowed nearly all of this vast wealth to pass into the hands of the few, leaving the original toiler stranded and helpless, irrigation builds up enduring commonwealths by establishing homes on the land, and by fostering a high order of citizenship, good institutions, and a stable Government.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the enquirer must accompany each question. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

DISEASE OF FOWLS.

"C. F.," Morgan, asks for a remedy for complaint among fowls. The fowls stagger and appear to be silly, and the comb goes black. The time from when the fowls take the complaint to death is about 24 hours. They are inclined to have diarrhoea.

Answer—The symptoms described may be due to several causes. Are there any poultry ticks on the farm where the affected birds are? If so, the trouble is due to blood poisoning consequent upon the bites of the ticks. Diarrhoea is a frequent outward symptom of blood poisoning in such cases. Remedy—Destroy all tick in the roosting houses, &c., by saturating the woodwork with strong kerosine emulsion (hot soapsuds 5galls., kerosine ½gall., churn well to ensure thorough mixing). The fowls also may be dipped in this when cool. If ticks are not present, the drinking vessels should be scalded, and then rinsed with a strong solution of potassium permanganate (commonly called Condy's crystals). Make a supply in a large bottle. Of this enough may also be added daily to the drinking water to give it a pink tinge. Birds badly affected with diarrhoea may have four to six drops of chlorodyne in a teaspoonful of water twice a day.

ERADICATION OF COUCH GRASS.

"G. W. C.," Exeter, asks for a means of destroying couch grass.

Answer—Couch grass is not effectively removed from amongst other plants other than by hand-picking the pieces out of the carefully turned over land. If it is in a plot from which all other plants may be removed, it is said to be possible, by covering this grass with a thick coating of stable manure, to induce it to grow up into the manure, so that in the course of a season no live stems remain in the soil beneath. The whole mass may then be removed bodily and spread out on a hard patch of ground, where it cannot take root, to dry or decay.

MAGNESIA.

"Cameo" wishes to know why trees, vines, and shrubs do not thrive on a well-drained soil which is coated with magnesia to depths varying from 8in. to 10in. In depths of 4in. they grew for about two years and then withered off. An attempt was made to get over the difficulty by filling holes 2ft. x 2ft. x 4ft. with new soil, but as soon as the roots touched the magnesia the trees died.

Answer—The only remedy likely to act is to leach the magnesia out of the soil by arranging the land in a series of checks, or basins, by raising banks around them. These should be filled to saturation with fresh water, which, after standing for some hours, should be drained rapidly off the land. This process should be repeated several times. If the water can be drawn away through subterranean drain pipes, all the better. This is a good time of the year to operate, as the summer evaporation will have deposited the magnesia in the surface layers of the soil. If abundance of good water is available, another method of regeneration is to sow lucerne thickly over the whole plot, and after it comes up remove those plants arising within a couple of feet of the trees; irrigate the lucerne freely in checks. This method of shading the soil with a deep-rooted, fairly salt-resisting plant such as lucerne, prevents the rapid upward movements of salts in solution in the moisture which is ordinarily drawn to the surface and evaporated. The roots of the plants seize the bulk of the moisture, draw it up, and transpire it through their leaves, but the salts are left scattered through the sublayers of the soil. Besides this, lucerne roots decay and make water passages for the rain to permeate the soil and carry soluble salts deeper down each winter, whilst these dead roots—which collected nitrogen and enriched the soil whilst alive—in decay further fertilise it and increase its moisture-holding capacity.

PARADISE APPLE STOCKS.

The Longwood Branch of the Agricultural Bureau asks whether Paradise apple stocks are blight proof, and, if so, if all kinds can be worked upon the rooted cuttings.

Answer—The Horticultural Instructor (Mr. Geo. Quinn) replies—"The original Paradise apple was not proof against the American blight, but many years ago the late Mr. Cole, of Victoria, raised a seedling therefrom which is claimed to be blight proof, and I have not seen blight upon this stock in South Australia; a statement which Mr. H. Wicks, the well-known nurseryman, who has grown it for years past, verifies. Under ordinary conditions of soil and climate this stock is very dwarfing in its character; consequently it is not to be recommended for use in general orchard work unless the trees are to be set out in particularly rich soil. A single working upon a rooted cutting of Cole's Paradise above ground level is sufficient to keep the root system free from the American blight."

THE HOME GARDEN.

"Backblocker," K.I., asks whether the Government distribute fruit trees free, and seeks information as to the most suitable trees for limestone soil.

Answer—(1) The department does not distribute fruit trees or vines, neither is the packing or forwarding of such undertaken by them. (2) For a home garden one acre in extent, with a limestone soil, moderately cool climate, and a rainfall of 20in. per annum or over, or where fresh water is available for irrigation purposes, the following selection of deciduous fruit trees and vines is suggested :—

Apples—Williams' Favorite, Cleopatra, Rome Beauty, Jonathan, Pioneer, Rokewood. Pears—Clapp's Favorite, Williams' Bon Chretien, Harrington's Victoria, Beurre Bosc, Josephine de Malines, Madame Cole. Apricots—Newcastle Early, Oullin's Early, Moorpark. Figs—White Genoa, Black Ischia. Almonds—Hatch's Nonpareil, Brandis, Peerless. Nectarines—Gold Mine, New Boy, Stanwick. Cherries—Bigarreau Napoleon, Florence. Plums—Angelina Burdett, Green Gage, Shropshire Damson, Orleans, Jefferson, Burbank. Peaches—Greemphage, Elberta, Louis Grognet, Lady Palmerston. Quinces—Champion, Smyrna. Mulberry—Black.

Grape vines.—White—Crystal, Sweetwater, Muscat Gordo Blanco, Dora-dillo. Black—Muscat Hamburg, Grand Turk, Black Hamburg, Zante currant. Red—Red Prince, Red Frontignac, Red Malaga.

Having prepared the ground by breaking it deeply, well plant the trees 20ft. apart on the square system, as soon as possible after the first soaking rains, and before the soil gets cold. After planting, prune the trees and vines back severely, only leaving a few buds upon each, so as to balance the top with the root system, which will have been reduced during the transplanting operations.

WHEAT WEEVIL.

"Wallaroo" asks for full information regarding the origin of wheat weevils.

Answer—*Life History and Habits.*—The females lay one egg in each grain. The grub, on hatching, feeds on the contents of the grain, and when full fed pupates in the eaten-out grain. In conditions extremely favorable to the weevils the whole life cycle can be completed in a month, but at lower temperatures and under ordinary conditions a considerably longer time is taken. It has been shown that a temperature of 80° Fahrenheit is the most favorable for the development of the beetles. Moisture in the form of water-vapour is very favorable for the weevils. A close and confined atmosphere is also likely to favor the growth of these pests. The weevils live for a long time. Kept in small corked tubes containing grain, in a sitting-room that had a fire in winter, some of these beetles (*C. granaria*) lived for nearly fourteen months. On being touched or shaken the weevils feign

death ; they lie, often for a considerable time, refusing to show any signs of life, even when handled. They may be induced to move by breathing on them.

Remedial Measures.—1. Fumigation with bisulphide of carbon is a very satisfactory way of ridding grain of the insects. The grain to be treated should be put in a bin or airtight receptacle, and the bisulphide of carbon poured into a saucer or shallow vessel and laid on the top of the grain. The liquid volatilises, and the fumes, being heavier than air, sink down through the grain and kill all insect life. One pound of bisulphide of carbon is sufficient for 100 bush. of grain. The airtight receptacle should be kept closed for 24 to 48 hours. A shorter time would do for small quantities of grain. In treating a store or mill, 1 lb. of bisulphide of carbon is sufficient for 1,000 cubic feet of space. Before entering the mill after such fumigation the doors and windows must be thrown open for an hour or two in order that the place may be well ventilated. If necessary a second fumigation might follow the first. Bisulphide of carbon has a very disagreeable odour, and as the fumes are poisonous they should not be breathed, though a little will do no harm. It is also explosive, and must be handled with care. No naked light should be brought near it, nor should the operator smoke.

2. Infested grain may be run through a sieve or screen, the meshwork of which is sufficiently fine to keep the grains back and yet let the weevils fall through, these being caught in a receptacle placed underneath containing paraffin. This sieving or screening, however, fails to reach grains that contain eggs or developing larvæ. The same objection can be urged against the practice of screening under a strong air blast, for infested grains will still to some extent remain behind.—*British Board of Agriculture Leaflet.*

STOCK INQUIRIES.

(Replies supplied by Veterinaries of the Stock Department.)

Sidebone in Horses.

"J. S.," Beaufort, asks for a description of sidebone.

Answer—Sidebone is ossification of the lateral cartilages to be found attached to the bone inside the hoof. In their normal state they can be felt at the back and side of the coronet, and are elastic and easily movable. When ossified they are bony and prominent.

Treatment for Fits.

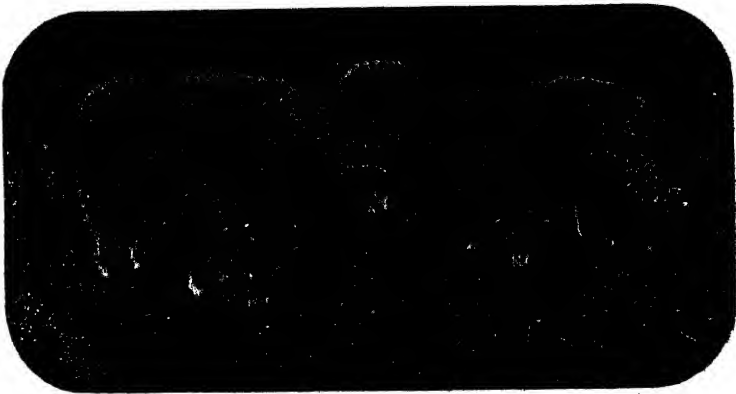
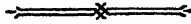
The Utera Plains Agricultural Bureau wishes to know the best treatment for a horse subject to fits.

Answer—Give the animal a physic ball, and follow with a 1-oz. dose of bromide of potash in the drinking water twice daily for 10 days ; then half doses for a week, and repeat if necessary.

Mange in Horses.

The members of the Davenport Branch of the Agricultural Bureau report that a number of horses in the district have rubbed the hair off their tails at the butt, and give the appearance of being hog-maned, due to rubbing under rails and against posts. They are anxious to know the cause of this rubbing, and whether it can be obviated. The trouble is attributed by some to the action of sand flies.

Answer—The trouble is probably due to a form of mange. Treatment consists in washing the affected parts thoroughly with warm water and soft soap, and when dry applying the following liniment:—Sulphur, 1oz. ; oil of tar, 1oz. ; raw linseed oil, 10ozs. This should be mixed and shaken well before using, and should be washed off after having been on for a week. It can then be reapplied if necessary.



AGRICULTURE IN OTHER LANDS.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College.

(Continued from page 892.)

TUNISIA.

LIVESTOCK.

The typical country Arab, unlike his cousin the Moorish artisan or shop-keeper of the cities, has the blood of many nomadic generations in his veins. Surrounded by his flocks and herds, he lives in the shelter of camel's hair tents, which can be struck at a moment's notice; or else in huts of brush, wood and mud, very rapidly put together, and at no more expense than that of a little uncongenial labor, which for the most part, however, falls to his womenfolk. Contemplative and ease-loving, beyond the bare necessities of life, his wants are of the slenderest. He has all the Oriental's dislike of manual labor; and if the earnings of a month or two of toil suffice to keep body and soul together for a twelvemonth, he can rarely see any good reason why his usual 10 months' holiday should be encroached upon. But even in the Arab's well-regulated life exceptional cases will occasionally arise; as, for instance, when he is bent on acquiring the wherewithal to purchase a wife. These traits in the character of the Arab make of him, perhaps, a better herdsman and flockmaster than he has been shown to be an agriculturist. It is customary to extol him as a breeder, particularly in the matter of horses. In this connection it is much to be feared that the latter-day Arab lives very unworthily on a reputation built up in the uncivilised days of a distant past. It is unquestionable that among the Arabs many an individual has inherited an instinctive knowledge of the good points of a saddle horse; and that at times a favorite charger may receive from an Arab quite as much attention as a member of his own family. In the main, however, the Arab's philosophy of life is summarised in a blind confidence in a beneficent Providence, which, in his view, altogether absolves him from any need to provide for the future. In the circumstances it is little to be wondered that the flocks and herds of the Regency alternately contract and expand, according as the seasons are able to kill them off, or, more rarely, are not able to put any special obstacle to their indiscriminate multiplication. The figures below, having

reference to the livestock of Tunisia in 1907 and 1908, afford a good illustration of these facts.—

Form of Livestock.	1907.	1908.	Loss. Per Cent.
Sheep.....	833,562	585,027	30
Goats	476,386	342,249	29
Cattle	158,062	159,272	—
Camels	115,748	106,175	8
Asses and mules	94,594	79,190	16
Horses.....	31,870	28,772	10
Pigs	14,644	10,771	26

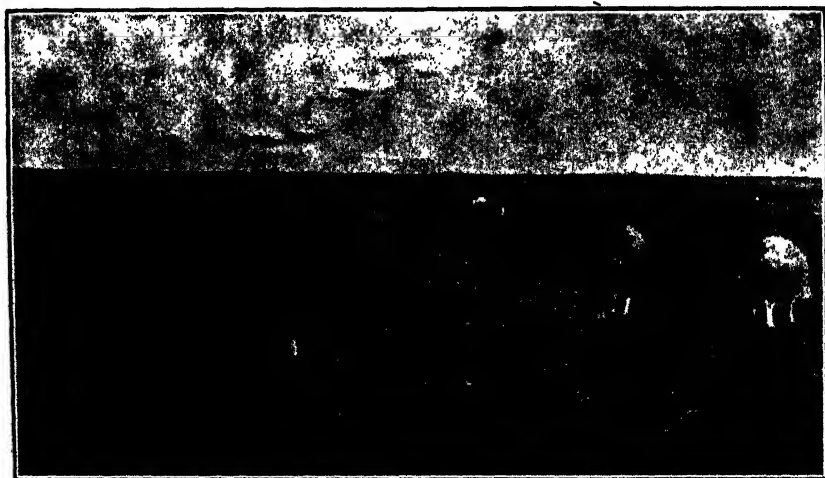
The year 1908 happened to be a period of drought, during the course of which, as will be seen, much of the livestock of the Regency perished. The figures for 1909 were not available at the time of my visit. It would appear, however, that still further reductions in the livestock of the country were anticipated.

SHEEP

From the point of view of numbers, sheep form the principal livestock of the country. I have already stated that the average French landowner has not yet learnt how to turn sheep to profitable advantage on an ordinary farm, and that, in consequence, the flocks of the Regency are mainly in the hands of the natives.

The typical sheep of Tunisia is the fat-tailed sheep, so common in Asia Minor and Syria. In many ways, from our point of view, this sheep is all that a sheep should not be. The coarse, short wool is more like hair than wool; the belly and legs are bare; whilst rough treatment and thorny bushes frequently make short work of what little wool nature meant to grow on the back. The clip of a flock is said to be of so little value as barely to account for the remuneration of the shepherd. Nor can it be said that as purely mutton sheep their general bodily conformation is good. They are lanky, with badly-developed legs of mutton, irregular back line, and heavy heads. The flesh, too, is rank and tallowy, usually selling at unfavorable rates both on the French and local markets. And yet the Americans are said to have evolved out of these defective sheep a breed which they have called Tunis sheep, and which they highly extol as producers of early lambs. This breed has, I believe, found its way into New Zealand, although with what degree of success I am not aware. There is only one explanation that occurs to me as tending to account for these unexpected American results. The tail development of the Tunisian fat-tail sheep, although not perhaps equal to that of some of their Syrian cousins, is nevertheless very considerable.

The breadth of the tail entirely screens the hindquarters, whilst its length always falls below the hocks. This monstrosity of a tail so much hinders natural processes that the rams, which are allowed to run with the ewes from one end of the year to the other, are quite unable to serve the latter without the aid of the shepherd. This tail is no more than a huge mass of fat, which, when melted down, forms the cooking fat mainly used by the poorer classes. It is easy to conceive how, in the course of centuries, so unnatural a tail may have been evolved amongst a people otherwise indifferent to, and perhaps ignorant of, the potent action of continuous selection. Here was part of a butcher's animal having a distinct commercial value of its own well apparent to all; and in picking out his rams the Arab or Syrian shepherd, as is the custom at the present time, paid almost exclusive attention to tail development. Unconscious selection of the kind extending over



Tunisian Fat-tail Sheep.

many centuries has, therefore, in all probability been responsible for the abnormal and functionally useless tail of the fat-tail sheep. It should be added, too, that this tail must form a sort of reserve upon which the animal can draw for a time in days of stress and starvation. It seems to me that this cult of the abnormally fat tail must have had the effect of breeding into the breed an exaggerated tendency to lay on fat, quite as much as Bakewell's artificial treatment of the Dishley Leicesters. If the tail be suppressed in early life, I take it that the tendency to lay on fat to an abnormal degree will still be retained, and in the absence of the tail will be deposited more evenly over the body. Hence, I take it, the explanation of the success of the Americans with these sheep in producing early fat lambs.

The Tunisian Government appears within recent years to have made strenuous efforts to displace the fat-tail sheep from the flocks of the Regency. To us their present aim will appear modest enough. They favor on the one hand what are described as the "Algerian Thin-tail Sheep," which are said



Carcass of Asiatic Fat-tail Sheep.

to be superior to the ordinary Tunisian sheep both as producers of mutton and of wool, although from our point of view still a very inferior breed of sheep; and on the other hand the Merino of La Crau, a barren stony plain of the south of France. This sheep may be described as an inferior type of short-wool Merino. The professional advisers of the Tunisian Govern-

ment argue, however, that coming as it does from very poor pasture land, it is more likely to succeed in the hands of the Arabs than the better types of Merinos that might otherwise be secured. The Government have undertaken the importation of rams of these two breeds at their own charge, distributing them amongst likely applicants at bare cost price. It is stipulated, however, that those securing Government rams must agree to exclude from their flocks for a period of at least three years all fat-tail rams. Applicants must also be in a position to show that they can afford suitable shelter for their flocks, and adequate forage supplies to tide over the lean portion of the year.

I took the opportunity of bringing under the notice of the authorities the South Australian Merino, which in my view would find in Tunisia pasture conditions somewhat analogous to those obtaining here. In other directions, however, conditions are perhaps not altogether similar. Tunisia is an open, unfenced country, in which all flocks must constantly be under the eye of the shepherd, one of whom generally tends 200 head. At night the flocks are generally placed within the shelter of temporary enclosures, built up as a rule out of the thorny bushes common to the country. This practice appears to be absolutely necessary as a protection against the jackals, which do quite as much damage as our own wild dogs. For the protection of the sheep the shepherd is always provided with watchdogs and gun and ammunition. Whether our Merinos, long accustomed to roam at their ease, would readily accustom themselves to this species of treatment, is of course open to question. To overcome the native shepherd's ineradicable prejudice against tailless sheep is another difficulty to be faced. Before coming to Australia I well recollect placing with a native shepherd four Merino rams, with instructions to use them freely. At lambing-time we had the grand total of two cross-bred lambs. The Merino rams, said the shepherd, fled whenever he approached the ewes to help them in their work. On the face of it the reason given appeared plausible enough, were it not for his unconcealed dislike for the tailless foreigners.

GOATS.

These hardy foragers are invaluable to the more or less thriftless Oriental graziers. In the towns, on the other hand—quite as much in the other cities of the Levant as in Tunis—goats almost entirely supersede the milch cows of Europe. Twice a day the tinkle of their bells is heard through the streets, and the milkman milks the goat at the citizen's doorstep and under his eye. One hears no complaints of watered milk or insanitary milking sheds. The taste of goat's milk is characteristic, but in time one gets used to it.

In the back country, particularly in the hilly sites of the drier districts, covered with brushwood and low shrubs, and more or less destitute of herbage,

the goat is invaluable to the Arab. Indeed, it will not only subsist, but even thrive, in localities in which all other types of livestock, with the solitary exception, perhaps, of camels, would starve. There are many, however, who pretend that the goat has been to Tunisia a curse in disguise. Just as the camel is now held responsible for the destruction of many of the shrubs of the Egyptian desert, so the present treeless condition of Tunisia is very generally attributed to the ravages of the goat. In so far as young trees and shrubs are concerned, the passage of a flock of goats will do quite as much damage as a bush fire. In their habitual pasture grounds no young tree can ever be expected to rear its head; and many are the naked, barren hills in Tunisia that bear eloquent testimony to the irrepressible activity of the goat. Summer bush fires are not unknown in Tunisia; many of them, it is stated, are started by the native owners of flocks of goats, so that later on their flocks may be able to browse in comfort on the stunted growth of the charred stumps. This is a severe indictment of the goat as a civilising influence; nevertheless, flocks of goats must long continue to represent one of the principal sources of wealth of the nomadic pastoral Arab. Indeed, I notice that goats are even commended to the attention of the French landowners as a profitable source from which butcher's meat, acceptable to the Arabs, might be supplied. Mutton, which, as a rule, is scarce for the most part of the year, consists of ram lambs at first, and later on of very old ewes, who have lost any value as breeders. It is recommended that male kids be castrated and sold later on as wether goats, at a time of the year when the meat market is generally bare. Now, whilst as an article of diet, little objection can be raised to kid even by the most fastidious natures, matured goat certainly calls for a specially seasoned palate; and yet if in Tunisia it is marketable, and apparently profitable, there should be no difficulty in accommodating one's self to existing circumstances.

The Tunisian goat is quite distinct from the ordinary European goat, being closely allied, apparently, to the better known Maltese goat. The goats to be seen in the neighborhood of the cities are very good milkers, frequently averaging as much as a gallon of milk a day. The leather from goat skin is very largely used locally in the manufacture of native foot wear and other articles in common use. Goat hair enters into the manufacture of various types of native clothes.

CATTLE.

The cattle-raising districts of Tunisia are situated chiefly in the north of the Regency, where a moderately heavy rainfall usually leads to very fair grazing conditions for five or six months of the year. In the summer months, however, once the stubbles have been eaten out and trodden under foot the unfortunate beasts have to hustle for a living. The Arabs, it has already

been stated, do not feel called upon to make special provision of forage for purely grazing animals. Providence and the unaided natural fruitfulness of the earth is supposed to take care of the latter. Hence, the little heaps of chopped straw and chaff, the residues of harvesting operations, are always kept back to support the working bullocks at ploughing time; since the latter can hardly be expected to take part in heavy manual labor and hunt for food at one and the same time. Consequently, beasts fat in the spring rapidly lose flesh with the approach of hot weather, and the young are almost invariably stunted in growth. In years of extreme drought the Arab owner is compelled either to sell his beasts for a mere song, or else see them slowly die of starvation.

The French authorities are inclined to make it a matter of reproach to the Arabs that they do not put their cattle under cover at night. They appear to infer that exposure to rough weather must necessarily prove injurious to the cattle, as is the case in colder countries. It is difficult to subscribe to this view. Tunisian winters are quite as mild as our own, and if the cattle were well fed, exposure to the weather would do no more than harden them. It should be noted that it is not dairy herds that are referred to here, but breeding herds, the main function of which is the production of working bullocks. As matters stand, in a country where fences are unknown and robbery fairly frequent, the Arabs are in the habit of shutting up their cattle every night in open roofless enclosures, in which they probably suffer more from rough weather than if they were allowed to graze freely in the open. Bulls, cows, and calves are all kept together in one promiscuous herd, with the result that calves are dropping at all times of the year; although it is stated that the hardships which the Tunisian cow has to face are so great that she rarely rears more than one calf in two years. The Arab milkers usually take half the cow's milk, the balance being left to her calf, which, of course, always runs with her, although provided with a special muzzle which prevents its feeding at will.

The chief function of the Tunisian cattle may be said to be to furnish the means of draught for general agricultural purposes. The Arabs rarely put a horse in front of the plough, although at times hybrid teams, one horse and one bullock, are occasionally to be seen unevenly yoked to a native plough. In the dry south, the hardier and equally deliberate camel tends to replace the ox as an agricultural draught animal. It should be stated that the native yokes are cruel, primitive implements, not calculated to turn to best advantage the maximum effort of the team.

For the most part, Tunisian cattle appear to belong to a breed common to the whole of the North African coastal country, and also to Spain. They are said to be analogous to the Texas cattle, and those of some of the South American States. Here and there crossbred animals are to be met with

connected generally with Italian and Sicilian breeds, and occasionally with French ones. Although on various occasions improved French breeds have been introduced into the Regency, they do not appear to have come into favor, even with the French landowners; mainly probably because of their inability to face with equanimity six months of slow starvation.

These Tunisian bullocks are small and sturdy, measuring from 43in. to 48in. at the withers; they are said to be docile and easily trained to work, whilst the work done by them is generally all that could be expected from their light weight and the meagre feeding rations allowed them. For the Arab, the unit of superficial area is represented by the "mechia"; that is to say, the area which the owner of a single team of bullocks hopes to break up and sow to wheat in the course of a single season, which generally extends to 25 acres. In ordinary circumstances, however, the Arab is perfectly satisfied with his efforts if he can succeed in sowing between one-half and two-thirds of his "mechia," which may be taken to measure the working capacity of small bullocks, kept alive on a few handfuls of chopped straw.

As butchers' beasts these cattle are said to fatten readily when good grass is available; as milkers, however, it is to be feared that Tunisian cows must be reckoned very poor. Their lactation period rarely extends over three months, during the course of which they probably do not average more than a gallon a day; although it is true that some are occasionally met with yielding as much as 1½galls., or even 2galls. a day.

Tunisia is within easy reach of Europe, and one would imagine that she would find some profit in exporting butter to the large consuming centres of the Continent. For success in this direction, however, the importation of improved breeds of cattle would be necessary; and this is not possible until Tunisian farmers shall have learnt to mend their ways.

CAMELS.

The "ship of the desert" is used throughout the Regency as a pack animal; and very weighty loads it is made to convey over the rough tracks that serve the purpose of roads. Again, with horses and mules, the camel shares the honor of going blindfolded from sunrise to sunset round the short circular tracks setting in motion the creaking wooden water-wheels of the native wells. In the extreme south of the Regency the camel takes the place of the ox as general agricultural draught animal.

This ungainly animal is relatively slow growing, not attaining to maturity until a full 8 years old; and with luck may attain to the green old age of 15 to 20 summers. The Arabs do not scorn his flesh, should fortuitous circumstances lead to his death. He is too valuable to them, however, to be made an habitual article of diet.

The secret of the camel's usefulness in desert regions is its ability to withstand thirst, and if necessary to subsist upon the hard, thorny shrubs peculiar

to these regions. The Arabs make use of the camel both as a pack animal and a saddle animal; the former is a clumsily built, heavy animal, capable of carrying with ease over long distances loads of 500lbs., and more; whilst the latter is more gracefully and lightly built, of great endurance, and capable of developing great speed. Riding camels are said to cover, without difficulty, in the course of a day's work, distances of 120 to 130 miles. The differences in build of these two types of camels are practically those that distinguish the draught from the saddle horse. Tunisian camels are reputed to be quiet and docile, albeit given to biting, a means of offence which their long sinewy necks enable them to resort to with great ease; hence, to keep them out of mischief it is customary to provide them with "Halfa" muzzles. Bull camels, however, are apt to be both treacherous and dangerous in the rutting season, during the course of which it is customary to keep them in confinement. Camels appear to be very prone to mange, which in serious cases gives them a very forlorn, moth-eaten aspect. The Arabs are very successful in warding off this disease by periodically anointing the animals with Stockholm tar. Tar is said to possess the additional advantage of protecting camels from flies and other troublesome insects.

ASSES AND MULES.

The ass is the inseparable companion of the poorer classes of natives; to them he is both pack and saddle animal, but is practically never availed of for traction purposes, as is the practice in various parts of Europe. The ass is to be met everywhere in the Regency, both in the cities and in the country, except at times in rough hilly country, the occasional lurking-place of hyenas. These beasts appear to have a particular liking for the flesh of the ass, and the existence of the latter is always more or less precarious wherever the former are to be found. Asses, notwithstanding their insignificant appearance, are probably able to carry heavier loads, proportionately to their weight and size, than any other domesticated beast of burden. It is no uncommon sight on the dusty Tunisian roads, to see a 14 or 15 stone Arab seated majestically on a diminutive ass, whilst his wife trudges along in the rear, goading the beast on, or else carrying some of the domestic effects of her lord and master. The average Tunisian ass is a rather small animal, inferior both in size and appearance to the Egyptian or Spanish asses. In the season, however, very superior types of Jacks are to be met with, travelling from market town to market town. The latter, however, are mainly used for the breeding of mules.

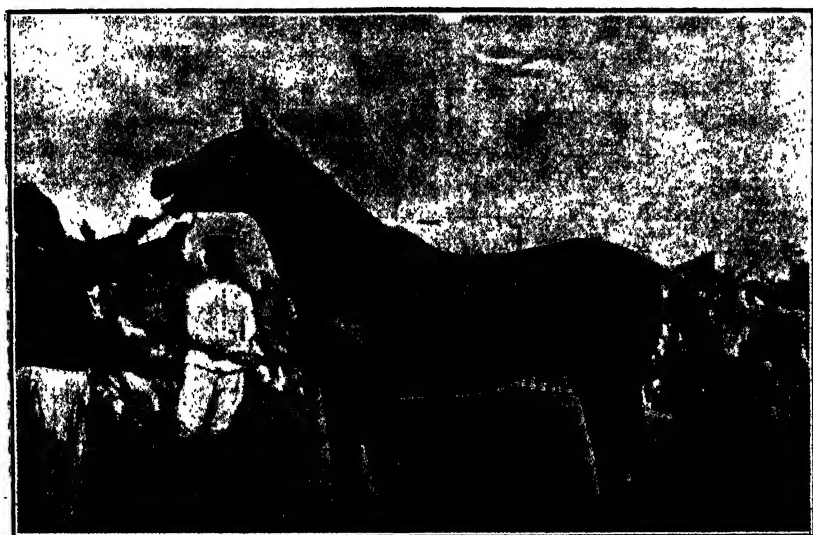
The Tunisian mule is considerably lighter and built on finer lines than the heavy draught mules of southern Europe. It is very freely used by the Arabs for both carriage and saddle purposes. It is the mule, too, that generally hauls the light carts of the country. The wealthy Arab is very fond of personal display, which he does not disdain to extend to the animals that

have the honor to carry him or haul him along. In this connection it is often brought home to one in Tunisia that a well-bred, well-groomed, sleek mule, set off in its gorgeous trappings, is a very showy beast.

French landowners generally make use of the heavy draught mules of southern Europe for general agricultural purposes in preference to draught horses, which are not readily obtainable in the Regency. They present the additional advantage of being hardier than horses, and less difficult in their food requirements. These beasts are generally drawn from France and Spain, and sometimes from Algeria. It would appear somewhat anomalous that they should not be bred locally to a greater extent than is the case.

HORSES.

The horse of the country is the Barb, or African horse, which is to be found throughout the coastal country of northern Africa. The Barb lacks, perhaps, the perfect symmetry of the pure-bred Arab; he has not the chest measure-



Tunisian Barb Mare.

ment nor the breadth of loins of the latter. Taken all round, however, the well-bred Barb is a typical light cavalry horse or saddle hack. The Tunisian Barb varies much in size, attaining at times 15.3 hands at the withers, whilst at others, particularly when mountain-bred, he is no more than a stout, active, sure-footed pony. Unfortunately, the general carelessness of the native temperament reacts quite as much on the horses of Tunisia as upon other forms of livestock. Sound and unsound horses are more or less indiscriminately mated together, whilst their general growth is allowed to

become stunted from lack of proper nourishment. In most cases young horses are broken in to saddle work at too early an age, or at all events, carelessly set tasks beyond their powers of endurance. Hence, strained tendons and general limb blemishes are rather the rule than the exception. The absence of fences to keep back horses within their pasture grounds leads the natives to hobble them when they are put out to grass. These rough hobbles are rarely examined or removed, and permanent injury to the limbs are usually the result. The Arab shows great appreciation for an easy ambling gait; hence, one of their first occupations is to teach the horse to amble at command, by methods that are more effective than humane. Unfortunately, undue reliance on this mode of motion invariably leads to a sort of shuffling movement of the limbs and a common tendency to stumble in most horses broken in by the Arabs.

On the whole, it would appear that well-bred Barbs are difficult to secure in a country in which one would expect them to be numerous. There are two light cavalry regiments stationed at Tunisia, and it is stated that they are unable to secure in the country sufficient remounts for their ordinary requirements. The Tunisian Government has taken various steps towards improving the condition of horse-breeding in the country; a stud book has been opened, suitable stallions have been imported from Algeria, &c.

The pure-bred Arab horse of Asia is occasionally to be met with in Tunisia, particularly in the southern districts, on the borders of the desert. Crosses between the Arab and the Barb are more frequent.

Apart from a few French mares casually imported by French landowners, and occasionally discarded heavy artillery horses, there are no draught horses worthy the name in Tunisia. Heavy agricultural work is usually left to bullocks and mules, whilst light draught work is occasionally done by the heavier types of Barb horses.

Pigs.

To the Mohammedan pigs are quite as much unclean animals as they are to the Jew; hence what pigs are to be found in Tunisia may be taken to belong exclusively to European owners—to the French in the country districts, and to the Maltese and Sicilians in the neighborhood of the cities. The local pig is, from our point of view, a very inferior type of animal, partaking a good deal of the greyhound in his build; indeed, his actively-built framework is all in his favor, for, like all forms of Tunisian livestock, he has to depend for his livelihood a good deal on his own ingenuity. It would appear that the methods of the Tunisian pigbreeders are very much the methods of our Saxon forefathers in pre-Norman days. The herds are allowed to roam about the cork oak forests in charge of a herdsman. Here they live on fallen acorns when the latter are available, or on what roots or bulbs they are able to root up. At times the surplus acorns are collected by Arab women and children, dried, and stored away for future use.

The wild boar is indigenous to Tunisia, and generally common in the districts in which these semi-domesticated Tunisian pigs are kept; and it is said that not infrequently the sows farrow striped litters, which tell their own tale.

The Tunisian pig does not fatten readily; indeed, he frequently dies when cribbed up in a sty. Therefore, the flesh as a rule carries a very high proportion of lean meat, but is not otherwise unpleasant. A few attempts have been made to acclimatise some of the better types of French breeds.

VINE-GROWING.

The native Arab population have from time immemorial been growers of table grapes, but it is only since the French occupation of the country in 1881 that wine-making grapes have been planted. The progress of the industry since that date is shown in the table below:—

Tunisian Vine-growing Statistics, 1882-1909.

Year.	Area.	Production.	Yield per Acre.	Price of Gallon in Bond.
	Acres.	Gallons.	Gallons.	Pence.
1882.....	4,415	?	?	?
1885.....	6,200	?	?	?
1890.....	15,415	?	?	?
1895.....	19,325	4,180,000	276	7½
1900.....	28,500	4,950,000	203	7½
1905.....	40,502	6,600,000	182	4½
1906.....	41,688	9,020,000	244	4½
1907.....	41,062	7,861,040	213	4½
1908.....	41,127	7,590,000	205	4½
1909.....	40,327	7,700,000	213	4½

In the above table, under "Area" are included both European and Arab vineyards. The latter are assumed to show no variation from year to year, and to be represented by the figure 4,165 acres. The columns dealing with "Production" and "Yields," on the other hand, have exclusive reference to the vineyards owned by Europeans. For these vineyards the average yield per acre is represented by 212galls. of wine, or what corresponds to about 1½ tons of grapes. And since the varieties grown are of the heavy-bearing type, such as Mataro, Morrâstel, &c., these yields must be looked upon as light. It should be recollected, however, that when vineyard areas are gradually extending in any country the total area under vines will always include a fair proportion of vines not in full bearing, or even not in bearing

at all. Yields, too, must necessarily vary with districts and with the individual skill and care of owners. It is stated that many of the well-kept older vineyards placed in the better districts yield between 520galls. and 700galls. of wine to the acre, corresponding to $3\frac{1}{2}$ tons to $4\frac{1}{2}$ tons of fruit.

There is no doubt that since 1905 Tunisian vinegrowers have found themselves in a very difficult position. Seasons generally have not been favorable to heavy yields, and the price of wine in bond before shipment has fallen from $7\frac{3}{4}$ d. to $4\frac{1}{2}$ d., and has remained constant at that price ever since. The average quantity of wine exported per annum during the past five years has been represented by about 2,000,000galls., having an average value in bond before shipment of £41,815; of this quantity the French ports absorb over 94 per cent. Thus it will be seen that a large margin is left for local consumption, and no doubt much of the wine produced realises more than $4\frac{1}{2}$ d. a gallon. Nevertheless, whenever there exists in a country a floating exportable margin of any article over and above local requirements, the pressure of low export prices must make itself felt on the home markets, with the inevitable result that many individuals are involved in great hardships. The result in Tunisia has been that uprooting has been started on a small scale, and, unless export prices show an upward tendency in the near future, it is probable that uprooting will be followed on a more extensive scale.

In this connection it is worth noting that the Tunisian vinegrowers are practically defenceless when faced with unremunerative prices for their wines. As is the case in the south of Europe generally, the cellars must be cleared before the new vintage, since no provision is ever made for storing more than one vintage at a time. Further, buyers would be more inclined to dock a wine that was more than one year old than offer a higher price for it. Hence the owner is practically compelled to accept whatever price is offering. Unfortunately, November—the time of my visit to Tunisia—represents the dead season in so far as the vine is concerned, and I did not have occasion to see many vineyards. I could not help noticing, however, a certain amount of neglect in the general upkeep of some vineyards, the owners of which in former years took a special pride in the thoroughness of their work. After all, 212galls. of wine to the acre at $4\frac{1}{2}$ d. at the port of export represents a gross return of only £4 an acre, which, after deduction of working expenses and interest on capital engaged, cannot leave much in the way of net profits.

In normal times, however, very little fault can be found with the general manner in which Tunisian vineyards are handled. Opinions in favor of subsoiling before planting appear to be very firmly rooted. It is stated that whenever the practice has been adopted the vineyard has come earlier into bearing, and in years of drought has suffered far less than vineyards that had not been subsoiled. Couch grass is the special bugbear of the Tunisian

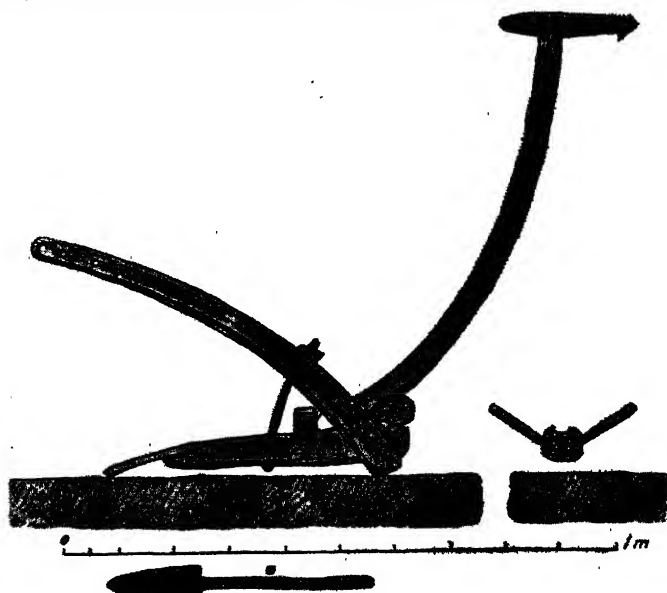
vinegrower, and it is strongly urged that this weed should always be thoroughly cleared out of the ground before planting operations have been started. If this weed be allowed to get a firm hold of a vineyard it has the effect of reducing yields very considerably; and to eradicate it completely from established vineyards some growers have been put to expenditure varying from £16 to £20 to the acre.

All Tunisian vines are grown on the bush, and trellising is practically unknown. Spur-pruned varieties are almost exclusively grown, with the exception of a few occasional patches of Shiraz or Carbenet. Artificial manures appear to have been no more effective for vines in Tunisia than they have been with us; and a good dressing of farmyard manure once in three years is very generally recommended.

Until very recently Tunisia stood amongst the few vine-growing countries as yet free from the phylloxera; but the neighboring vineyards of Algeria have been affected by the pest for many years past. A few years ago, however, a phylloxera patch was detected in a vineyard in the neighborhood of Souk-el-Khemis. Prompt steps were taken towards uprooting the affected vines and treating the soil with carbon bisulphide, and no further spread of the disease has been detected, although all the vineyard area of the Regency is subject to regular systematic inspection. Downy mildew (*Plasmopara viticola*), a disease from which we are fortunately free, is also common in Tunisian vineyards, particularly in years that are abnormally wet in the spring time. The presence of this disease has the effect of raising the cost of production, in view of the special preventive treatments which it throws upon growers. No recourse has yet been had to American vines, nor is there likely to be for many years to come, in view of the scattered condition of Tunisian vineyards, and the improbability of the phylloxera spreading very rapidly, even if it did ever get out of hand.

Individual Tunisian vineyards are, as a rule, very large, and in the hands of companies or wealthy proprietors. The average area would probably vary between 250 and 1,000 acres. The practice of selling grapes to wine-makers is practically unknown in the Regency; hence, every vineyard owner has his own cellar accommodation. In the earlier days of the French occupation some very expensively-built cellars were erected; the main object in view in these cases appeared to be to secure cool fermenting chambers, which were frequently built at great expense underground. The opinion, however, has come to prevail, as it has with us, that coolness of cellar premises was no guarantee, of low temperature in the fermenting vats, and that plenty of ventilation was one of the chief requisites of a good fermenting cellar. Refrigerating plants are now looked to as giving perfect control over the temperature of vats in fermentation. The cost of these machines is certainly heavy, but not beyond the reach of the large cellars in which Tunisian wines are usually made.

How do Tunisian wines compare with our own, and are they likely to enter into competition with us on the English markets? Tunisian red wines are stronger, heavier, fuller, more deeply colored than the average wine of the south of Europe. In all these points, however, they are generally inferior to our average type of export wine. It seems to me that they will continue to be so as long as Tunisian growers adhere to the heavy-bearing varieties that are almost exclusively grown there at present. I think, however, that if Shiraz were grown more extensively in Tunisia the type of wine made there would approach our own. I have already stated that the great bulk of the Tunisian wine trade is with France. In this country Tunisian wines, in con-



Tunisian Plough (after Ringelman).

junction with Algerian wines, are used mainly for blending purposes, in preference to Italian and Spanish wines, against which the French general tariff discriminates rather heavily. Tunisian wines do not appear to have found their way into England; if, however, these wines were heavier and fuller the low price at which they can be secured in bond might prove an irresistible temptation to London wine merchants. The moral of this is, I think, that South Australian exporters should beware of the danger of unduly inflating the price of export wines.

OLIVE-GROWING.

Olive-growing has at all times occupied an important position in Tunisian agriculture. Indeed, from the statements of ancient writers and the testimony of ruins and remains of ancient olive groves, it would appear that the

olive was far more extensively cultivated in the Roman era than is the case at the present time. When, in the seventh century, the Arabs overran Northern Africa they are said to have found it a well-wooded country, covered with luxuriant olive groves, extending almost to the edges of the great desert. Contemporaneous Arab writers, in their usual hyperbolic style, have stated that at the time of the invasion a traveller might proceed from Tripoli to Tangiers without stepping out of the shade of sheltering trees. Unfortunately, these nomadic children of the vast empty spaces of Arabia did not realise the value of their new possessions, and right speedily axes and fires were set the task of clearing the horizon, that the old familiar home conditions might be reproduced. It is in this manner that the great bulk of the olive plantations came to an end; nor has Tunisian olive-growing ever re-acquired its preponderating position in the agriculture of the country. Nevertheless, even at the present day, the importance of the industry is still very considerable, and a wise Government is doing all in its power to enable the olive gradually to recover lost ground. It should be stated that in all Mediterranean countries olive oil is, quite as much as bread, a staple article of diet with all classes of the population, but particularly with the middle and the poorer classes. It not only replaces butter, but is far more freely used than the latter; and particularly is this the case with the Arabs. But the olive groves of Tunisia can do more than supply the immediate wants of its own population. Under improved treatment, fostered by the intelligent support of government measures, the available export surplus is rapidly increasing. At the present moment olive oil represents one of the most important items amongst agricultural produce exported by the country; and in the near future there is every likelihood that it will eclipse all other exports. The figures below indicate the average value of the principal items of agricultural export during the past five years—

Average Yearly Value of Principal Items of Agricultural Produce Exported from Tunisia, 1905-1909.

	£
Barley	340,399
Olive oil	319,414
Wheat	123,403
Wine	42,624

The number of olive trees in the Regency in 1909 is given as 11,425,522. The distance apart at which they are planted varies with the districts; in the north, for instance, a distance of 25ft. in all directions is usually adopted; in the centre 40ft. is the usual distance, whilst farther south as much as 80ft. is generally adopted. If we assume 40ft. to be the average distance, this would give us about 27 trees to the acre, and a total area under olive trees for the Regency of about 423,168 acres. Many trees are as yet young, and not,

therefore, in full bearing. The olive oil production in the Regency during the past five years is indicated below—

Year.	Total Olive Oil Production. Gallons.	Value in Bond per Gallon.	
		s.	d.
1905	5,385,000.....	2	0 $\frac{1}{2}$
1906	5,346,000.....	2	0 $\frac{1}{2}$
1907	8,624,000.....	2	0
1908	1,496,000.....	3	4
1909	11,100,000.....	3	4

These various data will serve to give some idea of the present importance of olive-growing in Tunisia. The point, however, that should, I think, present the greatest interest to us is the ability of the olive trees to thrive even in the driest districts of this dry country. Most of us are aware that the olive tree is a highly characteristic feature in the landscapes of most south European countries; but we know, too, that these countries are neither as hot nor as dry as South Australia. Tunisia, on the other hand, presents climatic conditions analogous to our own; indeed, on the whole, its climate is perhaps more trying to vegetation than ours. It is worth noting, therefore, that the olive tree is profitably grown practically through the length and breadth of this country. It is to be found in the northern districts, with their 20in. rainfall; in the central districts with a rainfall averaging between 11in. and 12in.; and in the southern districts, where the average rainfall varies between 8in. to 10in., and where the general climate is extremely hot. Indeed, it is said in Tunisia that the olive can be grown to advantage in districts in which cereals fail three years out of four. In the circumstances, therefore, might it not be to our advantage to pay more attention to the olive in our drier localities?

Curiously enough, in Tunisia the most profitable olive groves are situated in the dry southern districts; mainly, it is true, because they appear to receive greater care and attention at the hands of their owners. In northern districts, whatever the character of the seasons, the cereals always leave a respectable margin of profit to the native grower; and although he has no conscientious scruples against the acquisition of fortuitous wealth, he generally objects to superfluous efforts which lead to the amassing of capital. The cereals are sufficient unto his daily bread; hence, his olive trees are neglected as unnecessary luxuries. In the dry south, on the other hand, the olive tree is the main source of the agricultural wealth of the country, and is respected accordingly.

In the north, crops of wheat and barley are frequently grown between the rows of olive trees. Indeed, at times the only form of tillage ever given to the olive grove is represented by what is essential to the growing of these

cereal crops. The trees are butchered rather than pruned, and always present an unkempt, neglected appearance. Many of the trees are of great age, the main trunk being no more than a thin layer of bark clinging to masses of dead wood. Manures are never availed of, and at harvest time the fruit, instead of being carefully picked off, is systematically threshed off with heavy wands, much to the ultimate disadvantage of the trees. This slovenly, neglectful treatment of the northern growers appears to have been a subject of anxiety to the Moorish Government as far back as the eighteenth century; and from the point of view of Government, not without sufficient cause. These olive groves were subject to direct taxation in proportion to the yields secured, and small insignificant yields meant a serious shortage of revenue to the Government. The remedies adopted by the Moorish Government would



Tunisian Well-water Lifter.

be considered drastic, even at the present time. The olive groves, although private property, were put under the supervision of a sort of native forest department, whose apparent duty it was to compel owners to bestow proper care upon their trees. Needless to say that very little good ever came of the supervision of these Eastern officials. The French Government, however, who within recent times have inherited amongst other things these special duties, have done all in their power to bring about a more rational treatment of these valuable trees. And they have been so far successful that new ground has been broken, and, after centuries of stagnation and retrogression, the area under olives shows once again a tendency to expand. In the dry southern districts the groves are well cared for and efficiently tilled, whilst it is only occasionally that intercalary crops are to be found growing between

them. Native growers are well aware of the scantiness of their normal rain supplies, and every effort is made towards turning to practical advantage every drop of rain that falls. As I have already shown to be the case in Greece, the olive groves are divided up into a series of basins, separated one from the other by elevated mounds or ridges, and connected by means of surface drains with the roadways and available catchment areas of the neighborhood. Hence, every drop of rain that falls is naturally directed towards the olive groves. The trees of the natives are very well pruned, and it is stated that in careful hands olive trees begin to become profitable towards their sixth and seventh years. Two facts appear to have attracted French landowners to this district: (1) The important profits to be derived from olive trees; and (2) the fact that Government land was being offered at very low prices, conditionally on its being planted to olive trees. Unfortunately, as generally happens in such cases, the French landowners, in their natural impatience to possess as early as possible vast areas under profit-bearing trees, attempted to put in larger areas than their means permitted them to attend to properly, with the result that the profit-bearing age of the neglected trees has frequently been put back to their twelfth and even their fifteenth year. Indeed, in these dry districts everything points to the fact that olive trees are profitable only so long as they receive the unremitting care and attention of their owners.

Whilst in Tunisia I had occasion to pay a hurried visit to Sousse, one of the principal centres of the olive-growing districts of the south. Unfortunately, 1910 proved to be an extremely disastrous year to olive-growers throughout the Mediterranean coast; and the neighborhood of Sousse was no exception to the rule. As I had already occasion to notice in Spain, there was hardly an olive to be seen on these Sahel olive trees; and the natives, who never think of making provision for lean years, are likely to be reduced to great distress. I visited some of the olive oil factories and was surprised to notice that quite green olives were being crushed. I was told that this practice was being adopted because the crop was so small, and the destitution of the natives so great that it was impossible to protect the trees from thefts.

The most interesting factory that I was able to visit in this district was that of Les Usines du Sahel. This firm does nothing but purchase the waste pressed pulp of the olive oil manufacturers of the neighborhood, from which it extracts, by means of carbon bisulphide, the residual oil that cannot be extracted by ordinary pressure and hot water. The process adopted for the purpose may briefly be described as follows:—

The olive pulp, or marc, is first freed from superfluous moisture by exposing it in open troughs heated by steam coils; when sufficiently dry the pulp is conveyed into huge metal cylindrical tanks, into which carbon bisulphide is pumped. The liquid gradually dissolves the oil, and is subsequently drained off into a retort, in which the carbon bisulphide is distilled off from the oil. It is condensed and may be used again for another mass of pulp. A steam

jet is made to play through the tank, so as to remove the last traces of carbon bisulphide and oil. Finally, the pulp is removed from the tanks, dried and used for fuel purposes by the firm, who find it superior to coal. This process extracts from the residual pulp of the olive oil manufacturers from 6 per cent. to 9 per cent. of a crude oil, which is used for the manufacture of soap, or for lubrication purposes. This oil always retains an odor and taste characteristic of the treatment it has undergone, and can never be used for ordinary culinary purposes.

I left Tunis on the 27th November, and, after spending a few days in the south of France, I paid a hurried visit to Italy. My time there, however, was very limited, and I was unable to collect agricultural data of any value.



FRUIT SHIPMENTS.

The following is an extract from the Trade Commissioner's Report, dated London, March 27th, 1912 :—

The apples ex the *Aseanius* have come to hand in a most unsatisfactory condition. I understand that to-day, in Floral Hall, Australian apples ex this boat have been disposed of at prices as low as 3s. to 5s. per case. Not only is the fruit very forward in condition, but it is showing extreme signs of wither and wilt. To make matters worse, London is now feeling the effects of the coal strike very severely, and provincial buyers are refusing to operate, because it is impossible for the railway companies to guarantee delivery. Bitter pit is showing up very badly in this consignment in a large number of boxes.

The *Macedonia* shipment has also come to hand to-day, but is in a much better condition, and has evidently been carried at a more favorable temperature.

Unfortunately further congestion of the market will be caused by the fact that a steamer from Nova Scotia is arriving to-day with 30,000 barrels of American apples.

With a view of temporarily relieving the congestion in London, I am in treaty with buyers both at Hull and Bristol, who are willing to operate provided that suitable arrangements can be made for delivery.

DISEASES OF FARM ANIMALS.

BY OFFICERS OF THE STOCK DEPARTMENT.

RESPIRATORY DISEASES IN HORSES.

(Continued from page 898.)

PLEURISY.

Causes.—Pleurisy usually occurs as a secondary disease, being usually preceded by inflammation of the lungs or pneumonia; in some cases, however, it exists as a primary disease. The principal cause of primary pleurisy is cold, exposure to cold winds being a very prolific source of infection. It is most marked in debilitated, pampered, and delicate animals. Improper stabling, insufficiency of bedding, damp floors, and defective drainage in stables, also draughty stables are all accessory causes of pleurisy. It is often associated with other diseases, and in some cases is caused by the spreading of disease processes from neighboring organs. It is a common sequel to pneumonia.

Symptoms.—The first appreciable symptoms are fits of shivering (rigors) and elevation of temperature. This rise in temperature is at first very considerable—up to 107° F. It, however, does not remain constant but is intermittent, *i.e.*, it rises suddenly and falls suddenly. The pulse is rapid and the breathing quickened and shallow, the abdominal muscles being brought very much into use, so that there is a characteristic heaving of the flanks (diaphragmatic and flank breathing). There is considerable pain shown if the chest wall is manipulated with the fingers, and the animal rarely lies down. If it does it generally prefers to lie upon the affected side. There is first of all a dryness of the outer surfaces of the lungs and the inner lining of the thoracic cavity (pleura), which is commonly known as dry pleurisy, in which friction sounds, caused by apposition of the two dried pleural surfaces, can be distinguished. This gives place later on to a condition in which the cavity containing the lungs (thoracic cavity) becomes more or less filled with a fluid effusion from the affected pleurae.

Treatment.—The animal should be placed in a warm well-ventilated stable and made comfortable with plenty of bedding. Green food (lucerne, &c.) should be given wherever possible, and plenty of clean drinking water pro-

vided. A strong mustard plaster should be applied to the chest on the affected side to assist in the absorption of the fluid. A saline powder, consisting of magnesium sulphate, 1½ozs.; potassium nitrate, 2 drams, should be given twice daily in the drinking water. An electuary, containing potassium chlorate 2ozs., green extract of belladonna ½oz., powdered camphor 1oz., powdered liquorice 4ozs., treacle 6ozs., should be smeared on the teeth, gums, and tongue with a smooth flat stick three times a day in doses containing ½oz. of electuary as a dose.

ASTHMA (BROKEN WIND.)

Symptoms.—This is a disease which chiefly affects old horses. The chief symptoms are rapid breathing, especially after hurried work, in which case the respirations may be as many as 60 or 80 a minute. The breathing is very difficult, and the animal in its endeavors to breathe appears as though choking. There is more difficulty shown in expiration than in inspiration, the former accounting for a characteristic pumping action of the abdominal muscles with a double heaving of the flanks. After standing for a while after exercise the rate of breathing in a horse suffering from asthma gradually slows down; but, whereas in healthy animals after exercise the rate of respiration becomes normal in about 10 to 20 minutes, in a horse affected with asthma this time can be extended to from half an hour to an hour.

When at rest an asthmatical horse often has a dull suppressed cough. There are often alterations in the pulse; usually it is accelerated (80 to 100 a minute), irregular, and weak. The animal sweats easily and manifests signs of distressed breathing soon after being put to work, especially that of a rapid nature.

Treatment.—In old chronic cases little can be done to effect a cure or even alleviate the symptoms. Doses of arsenic in the form of arsenious oxide, five to seven grains, have been given with good effect, or ½oz. of liquor arsenicalis can be given twice daily in the feed. Food should be given, damped for preference, and the animal allowed to partake sparingly of drinking water.

GENERAL DISEASES (HORSE).

RHEUMATISM.

A constitutional disease, the characteristic feature of which is local pain of a metastatic nature (changing from place to place). A muscular and an articular form of the disease are recognised. Rheumatism is popularly believed to be due to exposure to cold and damp, and no doubt chill acts as a predisposing cause. Animals once attacked are believed to be liable to a recurrence of the trouble. A disease of a rheumatic character appeared last year in many parts of the State and affected horses of all ages and sexes,

Muscular rheumatism in horses is usually restricted to the limbs. The affected muscles are hard and painful, sometimes swollen. The metastatic nature of the lameness is characteristic, *e.g.*, from a fore to a hind limb. In articular rheumatism there is more constitutional disturbance. Often more than one joint is affected, and they are hot and painful. This form of the disease often becomes chronic and leaves permanent enlargement of the joint.

Treatment.—The principal medicinal agent used in rheumatism is salicylate of soda; 2 to 4 drams should be given twice daily in a pint of water. The patient should be placed in a dry and warm stable. The diet should be of a laxative nature—mashes, green feed, &c. Salines, such as saltpetre and hyposulphate of soda, should be given in the drinking water. Local treatment consists in the application of hot fomentations to the affected part, followed by anodyne liniments, such as opium liniment. In chronic cases of joint affection iodine liniment is often beneficial.

LYMPHANGITIS.

This is a disease most commonly seen in draught horses, the local manifestations affecting the lymphatic vessels and glands of the limbs. High feeding with insufficient exercise is the principal cause. The disease usually appears suddenly after a rest of a day or so. For this reason it is popularly known as Monday morning disease.

Symptoms.—There is usually a shivering fit (rigor), but often this is not noticed. Usually one hind limb is affected, sometimes both, occasionally a fore limb. There is sudden swelling of the affected limb. The swelling is of a doughy character, and pits on pressure. The lymphatic vessels and glands inside the thigh and shoulder are hot and painful. The disease is most commonly seen in horses of a sluggish temperament. One attack of the disease is likely to be followed by repeated attacks, which lead to permanent thickening of the affected limb. Horses which have had the disease should have regular exercise and light feeding when not in work.

Treatment.—The usual treatment is the administration of a physic ball containing 6 to 7 drams Barbadoes aloes. Warm fomentation should be applied to the affected limb. Salines, such as Epsom salts, in the drinking water; laxative diet; walking exercise as soon as the swelling begins to disappear.

PURPURA HÆMORRHAGICA.

This disease is associated with grave changes in the blood, and usually occurring as a sequel to strangles, influenza, or some other debilitating disease. It sometimes occurs as a primary disease, even when the hygienic conditions are good.

Symptoms.—The disease is characterised by hæmorrhages into the skin, mucous membrane, and internal organs, with cedematous swellings of different parts of the body, usually the most dependent—head, limbs, abdomen, sheath, &c. In some instances the swelling of the head may be so great as to interfere with breathing. The swellings end abruptly. Where they are extensive there is usually sloughing of the skin. The lining membranes of the eyes and nostrils show blood-stained purplish patches (ecchymosis). There is great constitutional disturbance, loss of appetite, fever, constipation, etc. The disease runs a very irregular course, is liable to many complications, and recovery is very slow. The mortality is about 50 per cent.

Treatment.—The animal should be placed in good surroundings. A good, roomy, well-ventilated loose box should be provided. Careful nursing is of great importance. Good nutritive diet is necessary. Iodine is the principal drug used in this disease, and may be given in medicinal doses along with alcoholic stimulants. Chlorate of potash may be given in the drinking water—two drams twice a day.

HÆMO-GLOBINURIA.

An acute disease, known also as azoturia, characterised by sudden stiffness, usually of the hind limbs, general paralysis, and a coffee-colored condition of the urine. The disease develops soon after the animal has been put to work. A period of idleness is necessary, during which the feed ration is of a highly nitrogenous character.

Symptoms.—No symptoms are observed until the animal is put to work. A lameness or stiffness of the gait is suddenly developed. The muscles of the hindquarters become hard and swollen. The breathing becomes hurried, and profuse perspiration takes place. If the animal is forced to move he falls down and is unable to rise. The urine is dark-brownish in color.

Treatment.—The patient should be warmly clothed. If unable to rise, should have plenty of bedding placed under him. Diet.—Mashes, green feed. Plenty of cold water should be provided. Saltpetre 2 drams, Epsom salts 2ozs., may be given twice daily in drinking water. Large doses of alkaline carbonates, such as bicarbonate of soda 2ozs. twice daily, are recommended. Enemas of warm soapy water may be given to stimulate the bowels. It may be necessary to remove the urine with a catheter.

(To be continued.)

WHEAT SELECTION.

THE BALAKLAVA COMPETITION.

Mr. G. H. Stevens (Superintendent of Parafield Wheat Research Station) has furnished the subjoined report on the wheat selection competition which is being conducted under the auspices of the Balaklava and Dalkey Agricultural Society and Balaklava Agricultural Bureau. The conditions of the competition, briefly stated, are: Competition is open to any resident of the district within a radius of 15 miles of Balaklava township. Any variety of wheat may be grown, provided that it is a good average milling variety. The seed for the first year's sowing may be procured by the competitor from wherever he pleases, and from the crop produced must be selected the seed for the second year's sowing, and from the second year's crop the seed for the third year. The competition will extend over a period of three years. The cup, valued at £10 10s., offered through the Bureau, will be awarded to the competitor who grows the greatest quantity of wheat of one variety from a quarter-acre of land during the three years. The Agricultural Society offers the sum of £5 in two prizes—£3 and £2—for the highest and second highest yield respectively from the quarter-acre each year.

Mr. Stevens, writing to the secretary of the committee supervising the competition (Mr. B. R. Banyer), says—"I am forwarding the result of the Balaklava wheat competition, from which it will be seen that Mr. O. L. Rosenberg has gained first and third places with King's White and King's Red respectively, and Mr. K. Neville is placed second with King's White. I have made yield the main factor to be considered in the competition, and it is under this heading that King's Red and King's White have scored heavily, the first-placed wheat gaining 78.6 points out of a possible 80. From a milling standpoint Bunyip stands out above the others, with 9.5 out of a maximum of 10 points; but its low yield cancelled the advantage it gained in this respect. Following are details:—

ALLOTMENT OF POINTS.

1. Yield (80).—One point awarded for every 20lbs. of wheat per acre.
2. Milling qualities (10).—A. Percentage yield of flour (5)—Based on weight

per bushel to a large extent, the range to be considered from a milling point of view being from 57lbs. per bushel to 66lbs., as follows:—

lbs.		lbs.		lbs.		lbs.	
57	0.5	59½	1.75	62	3.0	64½	4.25
57½	0.75	60	2.0	62½	3.25	65	4.5
58	1.0	60½	2.25	63	3.5	65½	4.75
58½	1.25	61	2.5	63½	3.75	66	5.0
59	1.5	61½	2.75	64	4.0		

B. Color (2)—Based on past experience with samples of flour from the various varieties of wheat milled in the department, viz.:—

Fair 0.5 Good 1.0 Very good 1.5 Excellent 2.0

c. Strength (3)—Calculated on same lines as color, taking a range of from 40 to 50, viz.:—

40	0.5	42	1.0	44	1.5	46	2.0	48	2.5	50	3.0
41	0.75	43	1.25	45	1.75	47	2.25	49	2.75		

3. Purity of seed and type.—Based on notes taken at time of inspection of growing crop.

4. Weight per bushel.—One point for every pound above 60lbs. per bushel. Wheats weighing less than 60lbs. per bushel receiving no points under this heading.

RESULTS.

Competitor.	Variety.	Yield. Max. 80.	Milling Qualities. Max. 10.	Purity of Seed & Type. Max. 5.	Weight per bushel. Max. 5.	Total Points Stored.
Rosenberg, O. L.	King's White	78.6	6.5	5.0	5.0	95.1
Neville, K.	King's White	71.8	6.0	5.0	4.25	87.05
Rosenberg, O. L.	King's Red	70.6	5.5	5.0	4.0	85.1
Wagner, F. W.	Bunyip	68.4	8.75	3.5	3.75	84.40
Thomas, T., jun.	Yandilla King	72.4	6.75	4.0	1.75	84.9
Belling, T.	King's Early	67.4	6.25	5.0	4.75	83.40
Burden, H. P.	King's White	65.4	6.0	5.0	4.0	80.4
Neville, K.	King's Red	64.0	6.0	5.0	5.0	80.0
Traeger, J. H.	Yandilla King	62.0	7.5	3.5	3.0	76.0
Twartz, H. L.	Bunyip	58.0	9.5	3.0	5.0	75.5
Rosenberg, O. L.	College Eclipse	57.8	7.25	4.5	4.5	74.5
Traeger, J. H.	Leather Head	56.4	6.0	5.0	2.25	69.65
Neville, K.	Gluyas	58.2	4.75	3.5	1.0	67.45
Twartz, H. L.	Federation	49.0	7.0	3.5	3.0	62.5
Wagner, F. W.	Marshall's No. 3	50.2	5.75	5.0	0.75	61.70
Traeger, J. H.	Federation	47.6	7.0	3.5	3.25	61.35
Neville, K.	Marshall's No. 3	52.0	5.25	3.5	—	60.75
Thomas, T. A.	Federation	47.0	6.25	4.5	1.5	59.25
Goldney, R. S.	Genoa	45.0	6.25	4.0	1.0	56.25
Goldney, R. S.	Federation	33.8	5.75	4.0	0.5	44.45
Neville, K.	Jonathan	33.4	4.25	3.0	—	40.65

DETAILED NOTES.

The crops were inspected on November 9th, 1911, and the samples of grain were examined on February 15th, 1912.

O. L. Rosenberg—King's White, seed 75lbs., super. 120lbs. Almost ready for stripper; standing erect, 3ft. 7in., with exception of drooping heads; did not notice any shelling; moderate stooler; straw rather weak, but apparently able to carry heads; very even crop; not any strangers, with exception of a few white oats; some fine heads in this crop; blighted in one place; just a little rust noticeable on stem and flag; good grain. Weight per bushel, 65lbs.; yield, 6bush. 33lbs. from quarter-acre.

K. Neville—King's White, seed 75lbs., super. 100lbs. Ready to harvest; some good grain; no sign of shelling; standing erect, 3ft. 3in., with exception of heads drooping just a little; heads even right through; spikelets inclined to be open, with two or three barren; three grains across; straw weak; several thin patches, which undoubtedly will help to bring down yield; very little rust noticeable; not any strangers; not a good stooler. Weight per bushel, 64½lbs.; yield, 5bush. 59lbs. from quarter-acre.

O. L. Rosenberg—King's Red, seed 75lbs., super. 120lbs. Almost ready for stripper; showing no sign of shelling; standing erect, 3ft. 8in.; nice and even, showing some good square heads; straw much stronger than previous plot; no strangers noticeable; red rust on flag and stem; two or three barren spikelets; not quite so thick as previous plot. Weight per bushel, 64lbs.; yield, 5bush. 53lbs. from quarter-acre.

F. W. Wagner—Bunyip (imported from New South Wales), seed 45lbs., super. 70lbs. Standing fairly erect, 3ft. 3in.; fairly even; scanty stooler; straw medium weak, with very little foliage; heads tipped bearded, short, square at base, and run up to point; nicely filled; spikelets rather open, but seem to hold grain; two or three barren at base; no disease; rather many strangers. Weight per bushel, 63½lbs.; yield, 5bush. 42lbs. from quarter-acre.

T. Thomas, jun.—Yandilla King, seed 60lbs., super. 85lbs. In dough stage; slightly awned; standing erect, with exception of a few drooping heads; height 2ft. 11in.; fairly even; moderate stooler; some very good heads were noticed in this variety, and some rather short, with four to five undeveloped spikelets at base; a good number of strangers, including King's Early, barley, and wild oats; a good number of blighted or dead heads, and several patches of "takeall." Weight per bushel, 61½lbs.; yield, 6bush. 2lbs. from quarter-acre.

T. Belling—King's Early, super. 85lbs. Standing fairly erect, 3ft. 3in. high; rather scanty stooler; straw weak; heads bearded and fairly well filled; spikelets a little open, with three grains across, and several barren at base; few wild oats; just a little rust on stem; almost ready for harvesting; no sign of shelling; showing some good grain. Weight per bushel, 64½lbs.; yield, 5bush. 37lbs. from quarter-acre.

H. P. Burden—King's White (third selection), seed 70lbs., super. 100lbs. Almost ready to harvest; no sign of shelling; standing 3ft. 5in. high; rather thin, scanty stooler; straw inclined to be weak, though apparently able to hold up head; this plot rather uneven, owing to several very thin patches, the grower attributes the thin patches to drilling too wet; not any strangers noticeable; rather many wild oats; nicely-shaped heads, and well filled with nice-looking grain; just a little stem rust; spikelets rather open. Weight per bushel, 64lbs.; yield, 5bush. 27lbs. from quarter-acre.

K. Neville—King's Red, seed 75lbs., super. 120lbs. Almost ready to harvest; no sign of shelling; fairly good grain; scanty stooler, with straw stronger than previous plot; rather badly affected with red rust on flag and stem; several thin patches; heads bearded and rather open, not quite as full as previous plot; no strangers noticeable. Weight per bushel, 65lbs.; yield, 5bush. 20lbs. from quarter-acre.

J. H. Traeger—Yandilla King. Height 3ft. 4in.; scanty stooler; straw hollow and weak; good many strangers; this plot did not appeal to me; planted in a line with previous plot, and affected same way; more than one-half of it a good many strangers; great number of blighted or dead heads; in dough stage. Weight per bushel, 63lbs.; yield, 5bush. 10lbs. from quarter-acre.

H. L. Twartz—Bunyip (New South Wales), seed 52lbs. In dough stage; standing well erect, 3ft. 9in.; poor stooler; straw clean, hollow, fairly weak; heads tipped bearded, square at base worked up to point; very badly affected with strangers, wild oats, &c.; some very thin patches, grower says due to soil one end very thin. Weight, 65lbs.; yield, 4bush. 50lbs. from quarter-acre.

O. L. Rosenberg—College Eclipse, seed 75lbs., super. 120lbs. In dough stage; standing fairly erect, 3ft. 9in.; rather thin; heads color similar to Federation; two and three barren spikelets at base; straw inclined to be weak; red rust on flag and stem very noticeable; and some blighted or dead heads; strangers, wild oats, and a few King's Early; this variety is beardless. Weight per bushel, 64½lbs.; yield, 4bush. 49lbs. from quarter-acre.

J. H. Traeger—Leather Head. In dough stage; standing very erect, 3ft. 6½in.; fair stooler; straw hollow, but medium strong; at one end, where the crop is standing erect, the heads are a picture, large and square, but only two grains across, and two or three barren spikelets; more than one-half of this plot is very badly affected with "takeall" and rust on stem; not many strangers; if this plot had not been affected with "takeall," &c., it would undoubtedly have been the best; the grower reaped 42bush. two years ago. Weight per bushel, 62½lbs.; yield, 4bush. 42½lbs. from quarter-acre.

K. Neville—Ghryas, seed 75lbs., super. 120lbs. In dough stage; tip bearded; standing erect and even, 3ft. 6in., with weak straw; moderate

stooler; spikelets rather open, with two or three undeveloped; some very good heads; one-half of this plot appears to be an earlier Gluyas; it is affected with stem and flag rust; if the late half is Gluyas, not any strangers, few wild oats. Weight per bushel, 61lbs.; yield, 4bush. 51lbs. from quarter-acre.

H. L. Twartz—Federation, seed 52lbs. In dough stage; standing fairly erect, 3ft. 1in. high; medium stooler; straw hollow, medium weak; rather many strangers, which look like Silver King, and also wild oats; good deal of undergrowth, charlock, &c.; little rust on flag; some nicely-shaped heads. Weight per bushel, 63lbs.; yield, 4bush. 51lbs. from quarter-acre.

F. W. Wagner—Marshall's No. 3, seed 36lbs., super. 70lbs. Hand-selected heads; standing very erect, 3ft. 3in. high, and very even with exception of two patches, which are badly blighted; grower says too much stable manure; stooped very well; straw hollow, but fairly strong; few drooping heads, long, and well filled; spikelets just a trifle open, two or three barren at base; few wild oats; no rust noticeable. This is undoubtedly the best plot visited, and speaks well for hand-selected heads; the grain was rubbed out by hand. Weight per bushel, 60½lbs.; yield, 4bush. 11lbs. from quarter-acre.

J. H. Traeger—Federation. Average height, 2ft. 3in; very scanty stooler, and same end as two previous plots badly affected with "takeall"; some good, nice square heads; good number of strangers, including King's Early and Yandilla King, barley, and wild oats; badly affected with undergrowth. Weight per bushel, 63½lbs.; yield, 3bush. 58lbs. from quarter-acre.

K. Neville—Marshall's No. 3, seed 75lbs., super. 120lbs. Late; in dough stage; standing 2ft. 11in.; thin, scanty stooler; straw hollow, but medium strong; some very small heads, few good ones; spikelets set very closely, and from two to four undeveloped at base; a great number of strangers have been picked from this plot, a good number of wild oats; rust on flag and a little on stem; this plot rather better than Jonathan. Weight per bushel, 59½lbs.; yield, 4bush. 20lbs. from quarter-acre.

T. A. Thomas—Selected Federation, seed 60lbs., super. 85lbs. In dough stage; standing erect, 2ft. 7in. high; fairly even; rather thin, with some nice square heads, the remainder rather small, with a few blighted or dead heads; two or three undeveloped spikelets; rather many wild oats; smut and rust are absent; just a little "takeall"; straw inclined to be weak, but apparently able to carry its head; medium stooler. Weight per bushel, 61½lbs.; yield, 3bush. 55lbs. from quarter-acre.

R. S. Goldney—Genoa, seed 60lbs., super. 112lbs. In dough stage; standing erect, 3ft. 1in. high; rather thin, and only a medium stooler; straw medium strong; heads short, tapering at tip; three-grained, and two to three spikelets undeveloped; free from disease; strangers, few heads of like thew and wild oats; this plot looks healthy, but it is not going to be very prolific. Weight per bushel, 61lbs.; yield, 3bush. 45lbs. from quarter-acre;

R. S. Goldney—Federation, seed 60lbs., super. 112lbs. In dough stage ; standing erect, 2ft. 8in. high ; rather thin, scanty stooler ; straw inclined to be weak ; heads fairly well filled, but rather short, and two or three barren spikelets ; rather many wild oats and King's Early, charlock, cockspur. I am disappointed with Federation ; it evidently does not do well in Balaklava district. Mr. Thomas's plot is the better of the two ; free from disease. Weight per bushel, 60½lbs. ; yield, 2bush. 49lbs. from quarter-acre.

K. Neville—Jonathan, seed 75lbs., super. 120lbs. Late ; in dough stage ; standing 3ft. 2in. ; very scanty stooler ; small heads, and tips bearded, with good many blighted or dead heads ; straw very weak ; good deal of flag and stem rust ; good number of strangers, including King's Early, Gluyas, and wild oats, latter very prevalent ; very badly affected with undergrowth, charlock seed, grass, and rubbish ; spikelets set closely, two to five barren at base. Weight per bushel, 57lbs. ; yield, 2bush. 47lbs. from quarter-acre.



IMPROVING THE DAIRY HERDS.

TESTING INDIVIDUAL COWS.

By H. J. APPS, Dairy Officer.

If South Australia is to successfully compete with the world in dairying, some forward movement must be adopted. At the present time we are importing tons of butter from the Eastern States, whereas we should be in a position to quite easily supply our own demands.

The question arises, how can this be remedied? If we take the number of cows in milk, viz., 80,000 odd, we shall find that the average yield is only 260galls., which will produce barely 7,904,000lbs. of butter-fat on 3·8 per cent butter-fat test. If only two-thirds of this number were kept and they produced 400galls. per annum the State would benefit to the extent, roughly, of 1,216,000lbs. of butter-fat. In computing the average yield doubtless many of the cows registered as in milk are only milked in the flush of the season; this evidently, in many cases, being due to the diminished quantity yielded after four or five months' period of milking. It certainly does not pay to milk a cow producing a small quantity of milk. A farmer milking 30 cows, producing 250galls. on a 4 per cent. butter-fat average per annum, will secure 3,000lbs. of butter-fat, whereas if only 20 cows each yielding 400galls. per annum were kept, the herd, on a 4 per cent. butter-fat test, would produce 3,200lbs. of butter-fat. Not only would less labor be required in milking and attending to the smaller number of cows, but better attention as regards feeding could be given them. The only reliable method to employ for the purpose of raising the standard of the average yield of our dairy stock is the testing of dairy herds for butter-fat yields of individual cows. By the adoption of such a system it is easy to see that the farmer would be in a position to know which cow of his herd it paid him best to keep.

RESULTS IN DENMARK.

It is interesting to note what testing in this way has done for the Danish dairy farmer; records of a fairly accurate nature being thus secured of the yields of milk and butter-fat. The information thus made available has proved exceedingly effective in inducing the dairy farmer to adopt improved methods of breeding, feeding, and culling of dairy cows. At the time the

first testing association was formed in 1895, the value of the butter exported from Denmark was less than £3,000,000. In 1901, when over 300 of these associations had been established over the country, the value of the butter exported was nearly £6,000,000, or an increase of nearly 90 per cent. in six years; and at present Denmark exports dairy produce to the value of £11,000,000.

This enormous increase, it is generally conceded, was for the greater part due to the work of the testing associations in weeding out the unprofitable cows, whereby the average production of the milking cows was increased. The cost of keeping the yearly records was shown by the reports of the testing societies to be from 1s. 8d. to 2s. 6d. per cow, while the increased returns per cow, as a result of five years testing, was from 25s. to £3 per annum. This rate of increase must be deemed to be eminently satisfactory, and the extraordinary increase in the number of societies in Denmark proves how highly their work is appreciated. It would seem that methods which have proved of such marked benefit in Denmark should not much longer remain unheeded in this State.

HOW THE TEST IS MADE.

With proper arrangements, recording the weight and test requires but very little time. With a milk sheet properly ruled, and with the names or number of the cows, together with the day of the month placed on it, a pencil hanging to a string, and a spring balance, all conveniently located in the halls where the milking is done, the milkers will be able to record the amount of milk at each milking in a few seconds. Each sheet could be made out for one month. At the end of the month the figures could be totalled, and at the end of the year one could tell the exact amount of milk and butter-fat each cow had produced. Once or twice a month one day's, morning's and evening's milk should be tested, as the test of the milk is liable to vary from time to time. But a test taken, say, two days in each month, and this taken as the average of the month, will approximate at the end of the year very closely to the actual amount of butter-fat the cow produced during that period.

Guesswork is of no use in ascertaining the value of a dairy cow. Systematic recording of the weight of milk and testing is the only true method of relieving the herd of the robbers, or boarders. When testing societies have been in force for two or three years, a pedigree bull of good milking strain has been used, and the heifers of the best cows kept, the improvement of the herd should be accelerated. Any number of pedigree bulls, with a greater or less number of prizes to their credit, can be obtained, but to find a breeder who can give a complete dairy record of the dam and grandam is another matter; yet such a system is what is required if we are to build up herds with any degree of certainty. If certificates were issued to pure-bred cows producing 250lbs. of butter-fat and giving the kind of bull she was bred to, it would make it far

easier for anyone desiring to improve his herd to know where to make his purchases.

Not only does the daily record of milk act as a guide to the treatment of the cows as regards feeding, &c., but it also enables the herdsman to immediately notice any irregularity in health, &c. It is also the means of promoting healthy rivalry among the milkers, who become quite interested in the daily amount of milk each cow produces. In Denmark the testing has proved of such great benefit to the dairy farmers that before awarding a prize at the show, the yield of milk and butter-fat is taken into account.

Show testing, in my opinion, is of no vital value, in so far as the yield of milk and butter-fat returns of a cow is concerned. Such cows are under test for a couple of days only, and the point which the dairy farmer desires to know is what the cow yields in milk and butter for the year; a sprint, as it were, gives no indication to the cow's yearly record. It would be far preferable to give prizes for the best herds.

Some dairymen have cows which they think are most profitable because they give a large amount of milk. This may be so, but many a dairyman has found after using the scales and test that the cow which he thought best does not pay for her feed, or at least is not the most economical milker. The one he thought unprofitable is probably one of the best.

Many dairymen will ask how to keep systematic records. The only things necessary are the scales and record sheets. All milking buckets should be of the same weight and the spring balances set at zero; this will obviate the necessity of deducting the weight of the bucket each time a cow's milk is recorded.

INCREASED YIELD.

It is not too much to say that by the establishment of testing societies the average yield of our dairy cows will, within a period of four years, have been increased from the present low standard of 260galls. to 450galls. There is no other method whereby the true value can be arrived at than by keeping records. All estimates and guesses miss the mark and are absolutely unreliable. Such recording brings many surprises to the most experienced dairyman.

The Scottish Commissioners in their report state that scientific breeding and culling on milk record lines has enabled the farmer in Denmark to reduce the cost of producing a pound of butter by 3d. Ten years' experience of it in Scotland has put hundreds of pounds into the pockets of those keeping records.

Among the results of the practice of keeping records are :—(1) It enables one to know the profits obtained from each cow; (2) it aids in building up the herd; (3) it aids the buyer in selecting dairy stock; (4) it increases the selling value of the stock; (5) it adds to the value of the pedigree of an indi-

vidual beast ; (6) it is the means of encouraging more interest in the dairying business ; (7) it stimulates instant inquiry if cows are not thoroughly milked out ; (8) it is the means of frequently calling attention to impending sickness ; (9) it is the only way to lead to success in dairying.

It will, of course, become necessary to reject a great number of stock after the first year's trial. These cows should be speyed, as this will obviate the danger of other dairymen buying them for the purpose of building up their herds. This is the only fair method to employ, as otherwise these rejected animals would be submitted to auction, with the result that dairymen would possibly buy for their herds cows which have been proved worthless as milk and butter producers.

Cow testing is distinctly and immediately of value to every factory, for directly a dairymann begins testing cows individually he commences to take more interest in the herd and is likely to supply not only more, but far better quality, milk or cream. Once the dairyman bestows the necessary and all-important attention to the raw product it will certainly be in the interests of managers to follow this matter up and make it a point to interest every dairyman in cow testing.

PARALYSIS OF HORSES AND CATTLE.

CONTAMINATED FODDER.

[REPORT BY GOVERNMENT VETERINARY SURGEON.]

The Government Veterinary Surgeon (Mr. J. F. McEachran), who has been investigating the cause of toxæmic paralysis of horses and cattle has, at the request of the Minister for Agriculture (Hon. T. Pascoe), prepared for publication the following summary of his progress report :—

“ Considerable mortality, with symptoms of paralysis, has occurred among horses in various parts of the State, but chiefly north of Adelaide. The majority of the outbreaks take place in the summer months, and there is a marked and constant drop in the number in the winter. The disease, though

not confined to particular districts, seems to recur in certain neighborhoods. The number of cases in outbreaks vary from one to 25. An analogous disease exists among cattle—what is popularly known as ‘dry bible’—a paralysis attacking them during the same period as that affecting horses, and with practically identical symptoms and similar *post-mortem* appearances. Both appear to have the same origin. Various causes have been blamed for this disease, and these can be briefly discussed as follow:—1. Worms.—The prevalence of the so-called blood worms in horses, and the fact that these can easily be discovered after death, has led stockowners and others to consider these worms as the cause of the outbreaks of paralysis in horses. The symptoms attributed to blood worms are intermittent colic and intense diarrhoea, with blood-stained manure. These symptoms are absent in the cases under our notice. The veterinary officers of the department have come across typical cases of paralysis in horses, and could not discover blood worms after death; moreover, they were not present in any of the horses which died of paralysis in the recent outbreak in Victoria. Cattle are not affected with blood worms, and paralysis causes the deaths of large numbers of cattle every year. The blood worm theory must be discarded as irrational and unscientific. 2. Water.—Many incline to blame the water supply, but as outbreaks occur on farms where that is above reproach, water as a causative, or even a contributing, factor must be ignored. 3. Insanitary conditions.—The practice of allowing manure to accumulate in and around stables is, unfortunately, too common, and is not conducive to the health of the horses. Insanitary yards are breeding grounds for vegetable and animal parasites; but as cases of paralysis have been observed among animals running at pasture, the existence of insanitary conditions, though highly detrimental, cannot be considered an essential factor in the causation of this disease. 4. Poisonous weeds and plants.—Careful examination of fodders revealed no plants suspected of poisonous properties. 5. Bacteria.—The microscopical, cultural, and inoculation results have been so far negative. 6. Mice.—A number of outbreaks of paralysis appeared in districts affected with a plague of mice, but this is not a constant condition. Mice plagues may invade districts without the production of paralysis in horses or cattle. 7. Food.—Paralysis chiefly prevails during the summer months, or soon after harvest. In the literature dealing with this trouble in other parts authorities are strongly in favor of some poisonous agent in the food as being the cause of the disease.

“ In Scotland we used to encounter a paralysis affecting the horses feeding on rye grass at a particular period of its growth, and on removal of animals from the dangerous pasture no further cases developed. Stockowners in this State who have carried out the advice of the veterinary officers and removed the horses from their immediate surroundings, and changed the feed, have had no further cases of paralysis. The investigation of the majority of

outbreaks of paralysis in horses revealed the existence of musty and apparently contaminated food. In other outbreaks the fodder appeared sound and wholesome; but in the examination of fodder, contamination might easily be overlooked.

RESULT OF EXPERIMENTS.

As the symptoms and *post-mortem* appearances pointed to food poisoning, feeding experiments were repeatedly recommended, but it was not until December 19th, 1911, that we were enabled to carry out experiments with suspected fodder on two horses and two cows. These animals were in comfortable stables in the city, and feeding experiments were carried on until February 19th of this year. During the period one of the animals (an aged bay gelding) showed signs of illness indicative of fodder poisoning. The other exhibited no symptoms of disease. The bay gelding was slaughtered on February 19th, and examination of the organs revealed conditions suggestive of fodder poisoning. The facts that this horse developed symptoms of illness, and that the *post-mortem* appearances were fairly positive, indicate that something deleterious was present in the fodder, although (probably) not in sufficient quantities to cause paralysis and death.

"Towards the end of last year three horses in a stable in South Melbourne developed typical symptoms of paralysis. Professor Gilruth, of Melbourne University, investigated the outbreak. Experimental work was immediately begun. Fodder (bulk chaff) was secured from the stables, and four horses and one cow were fed. The four horses showed symptoms of paralysis at times varying from five to 15 days after feeding commenced, and the cow also developed symptoms of localised paralysis. These experiments unquestionably demonstrate the presence in fodder of some poisonous agent which produces paralysis and deaths in horses and cattle, and it is a point of great interest that the official view in Europe and America generally is in accord with that here. The nature of the causative agent must now be investigated, and should be sought for laboriously. The importance of such an investigation cannot be over-estimated, for the disease is becoming far too common, and the monetary loss is great. Further experimental work is necessary, and I respectfully urge the department to spare no reasonable expense in elucidating the trouble."

POULTRY NOTES.

By D. F. LAURIE, Poultry Expert and Lecturer.

OPERATIONS FOR MAY.

POULTRY FOODS.

The recent rise in the price of various cereals and mill by-products used in feeding poultry may cause some people to half starve their birds. To do so would be a great mistake. Unless the hens are fed upon a sufficiency of food of the right sort one cannot expect eggs. A good laying hen will, after supplying the needs of her system, convert the remainder of her digestible food into substances within her body and from which eggs are elaborated. It is more important to feed the poultry thoroughly when foodstuffs are dear than perhaps is the case when they are cheap. I mean that there may be a sufficiency of cheap food at some times, but when the food is dear it is important to get the best results from its use. To half feed your poultry means that you may enable them to exist, but there will be no profit.

PROFIT OVER COST OF FOOD.

The details of the laying competitions published in the April number of this journal showed that there was a very substantial average profit per hen after deducting the cost of food. If the food had cost half as much again there would still have been a profit of £1 for every eight hens. All the food used was of a simple nature, and such as is within the reach of any breeder. It was purchased from time to time at market rates. I see no reason why the present prices of food should long continue, as the increase is abnormal. On previous occasions when the market has hardened considerably breeders have been prone to reduce stock. Good stock should yield a profit even at much higher rates than are likely to exist. Of course, if one has unproductive stock it should be disposed of irrespective of the fact that foodstuffs are either dear or cheap.

REDUCING STOCK.

In cases where there are good reasons for reducing stock the following recommendations are worthy of consideration :—

1. Reduce by discarding all inferior, unthrifty, and aged specimens,

2. Dispose of surplus male birds. These eat food and give no return unless used for stud. The surplus males also occupy the space which should be occupied by profit-making pullets.

3. Many breeders keep too many breeds or varieties. Keep one breed and specialise; breed none but good ones for the purpose in view. At the outside you may keep two breeds; say, one for egg-production and the other for table-bird breeding.

Many people, especially beginners, are inclined towards many varieties, and as a result they do not do justice to any one. One of the great drawbacks of country poultry shows is to be found in those pot-hunting exhibitors who show half a dozen or a dozen breeds for the sake of the prize money. Such people do not advance the poultry industry, rather do they retard it. The most famous breeders in the world are those who keep to one or two breeds, and turn them out to perfection. It is the same with utility fowls—you can only develop one first class laying strain, and have not time to look adequately to the needs of half a dozen varieties.

FOODS TO USE.

The average farmer feeds on grain alone. His wife or daughters generally own the poultry, and, if he be a generous man, the farmer places sufficient wheat in the barn for the use of the poultry. Farm fowls, at large, gain a good deal of their food in the form of insect life and in the stables and around haystacks. The farm yield of eggs would be much heavier if the farmer turned part of the poultry wheat into meal and purchased some bran to mix with it. He should also set aside some bags of short-cut hay chaff—from wheaten hay which was cut on the green side. A third by bulk, of the food required, of this hay chaff should be soaked overnight and mixed in the morning with the wheat meal and a little bran. A pinch of salt added to the water in which the chaff is soaking will be an improvement. Lucerne hay chaff is of much higher feeding value than is wheaten or oaten hay chaff.

At midday the fowls should have chaffed green food. Every farmer should grow rape, kale, lucerne, &c., for his stock, and any of these would be excellent for the poultry. At night (an hour before sunset) the birds should have a feed of wheat or other good grain available. If this method is adopted the food bill will be very much reduced and there will be many more eggs.

The suburban breeder is expected to keep a better class of fowl than is found on the average farm. He will also be well-advised to alter his system of feeding in the direction indicated. Oats, barley, peas, and a little maize can be ground as well as wheat, and are available and profitable foods. The value of bran is largely due to its phosphorous content. It is also valuable for making the mash of proper consistency. The ground grains all contain bran, and the addition of steamed chaff and cut green food with a little bran

will make a mash of high feeding value, of proper texture, and yet cheaper than ordinary bran and pollard. Do not be misled into using inferior foods. Pay for good food and use it judiciously. It is utter folly and most wasteful and cruel to the birds to use damaged or very inferior foodstuffs.

SINGLE TEST YOUR PULLETS.

Some few South Australian breeders have become known throughout the world as breeders of laying strains of exceptional merit. They obtained these strains of layers only by carefully single testing each pullet before she was used in the breeding pens. You can, on application to the Poultry Expert, Adelaide, obtain, free of charge, a bulletin which tells you all about the single testing method of breeding for egg production. Send for one and test your pullets. As pullets should not be used as breeders you lose nothing by testing each one for 12 months. If the pullets prove to be good layers they are worth a lot of money; if they are poor layers they should go into the kitchen. Single testing is the only road to success in building up a laying strain.

THE PRICE OF EGGS.

The market price of eggs is not abnormal for the time of the year. On April 28th the price of eggs in former years was as follows:—1905, 1s. 4d.; 1906, 1s. 2d.; 1907, 1s. 4½d.; 1908, 1s. 4½d.; 1909, 1s. 7d.; 1910, 1s. 3½d.; 1911, 1s. 5d. This year the price was 1s. 5½d. Quite a number of people have waylaid me in the street, &c., and poured out their grief at having to pay so much for eggs. I am glad that times are so prosperous that eggs are being consumed as freely at present rates as when they were 8d. a dozen. It is also satisfactory to the poultry-breeder that prices are such as give him a little return for his outlay. It would be a good plan if all these martyrs to high prices would erect a modern scratching shed and stock it with a dozen good laying pullets. They would then have their eggs at the actual cost of the food. A few thousand more breeders would be welcome, as the merchants can sell a lot more eggs than they receive at present.

GENERAL.

Erect scratching sheds, facing the north or north-east. Use clean straw litter.

Feed your birds as suggested and see that the drinking vessels are clean. Provide grit (hard and shell), also charcoal grit. Give a daily supply of green food.

Keep a sharp lookout for chicken pox. If a few warts or pimples appear on comb, wattles, or eyelids, bathe with vinegar and water, dry, and then apply carbolised glycerine (1 in 15). Use Epsom salts in the drinking water.

Repair coops, brooders, yards, &c., and see that all vermin is destroyed.

Hatch early chickens—they will pay well.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started April 1st, 1912, and to terminate March 31st, 1913.]

Competitor.	Eggs Laid for Month ended April 30th.	Total Eggs Laid from April 1st, 1912, to April 30th.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS.

Cowan Bros., Burwood, N.S.W.	46
Tabuteau, J. O., Black Rock, Melbourne	69
Hodges, H., Pyalong, Victoria	18
The Range Poultry Farm, Toowoomba, Queensland	38
Brundett, S., Moonee Ponds, Victoria	46
Jessup, W. C., Caulfield, Victoria	21
Dawes, J. H., Granville, Sydney	68
Beadnall Bros., Gawler	77
Redfern Poultry Farm, Caulfield, Victoria	20
Kerr, R., Longwood, S.A.	102
Eckermann, W. P., Eudunda	40
McNab, J. A., Sandringham, Victoria	64
Mazey, P., Alberton	4
Broderick, P. J., Gawler	1
Redfern Poultry Farm, Caulfield, Victoria	60
Braund, J. E. and H. J., Islington	16
Dunn, L. F., Keswick	48
Hocking, E. D., Kadina	43
Groom, E., Peterhead	57
Pope, R. W., Heidelberg, Victoria	39
Haines, T. F., Fullarton Estate	6
Provis, W., Eudunda	32
Burton, W. S., Moonta Mines	66
Broster, G., Mallala	4
Brain, J. H., South Yan Yean, Victoria	87
Sargenfri Poultry Yards, East Payneham	74
McKenzie, H., Northcote, Victoria	55
McDonnell, J., Greytown, Rosewater	57
Browne, A. B., Hawke's Bay, N.Z.	39
Brain, J. H., South Yan Yean, Victoria	—
Marsson, C., Welland	4
Hutton, C., Parkside	31
Miels, C. & H., Littlehampton	—
Moritz Bros., Kalangadoo	82
Odling H., Mitcham Park	18
Troughbridge Poultry Yards, Edithburg, Y.P.	4
Irvine, A. W., Epsom, Auckland, N.Z.	41
Walker, P., Hicksborough, Victoria	58
Lampe, B., Kadina	17
Waite, F. J. O., Nailsworth	67

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended April 30th.	Total Eggs Laid from April 1st, 1912, to April 30th.
SECTION I.—LIGHT BREEDS—Continued.		
WHITE LEGHORNS.		
Badcock, G., Mile End	29	
McClelland, A., Mordialloc, Victoria	18	
Tomlinson, W., Clarence Park	26	
Roberts, L. L., Kadina	47	
"Stratheona," Long Plain	18	
Whitegate Poultry Farm, Deepdene, Victoria	23	
Purvis, Miss Gracie, Glanville	76	
Padman, A. H., Hyde Park	107	
Sickert, P., Clarence Park	48	
Purvis, W., Glanville	49	
Rice, J. E., Cottonville	70	
Hamill, H., Kogarah Bay, Sydney	24	
Gurr, W. E., Kapunda	18	
McLeish, E., North Adelaide	8	
Craig Bros., Hackney	23	
Uren, Mrs. P. A., Kapunda	120	
Perry, Wm., Murrumbidgee, Victoria	34	
Nancarrow, J. T., Port Adelaide	28	
Bertelsmeier, C. B., Clare	73	
Tockington Park Poultry Farm, Grange	70	
Trenwith, T. H., Kadina	21	
Knappstein & Bray, Clare	9	
Whitegate Poultry Farm, No. 2, Deepdene, Victoria	33	
"Denahollow," Caulfield, Victoria	2	
Hill, Chas., Monarto South	5	
"Islay," East Malvern, Victoria	38	
Cosh, A. J., Burnside	27	
Indra Poultry Farm, Freeling	13	
Whitrow, A. J., Knoxville	53	
Hall, T. C., Rose Park	22	
Ontario Poultry Farm, Clarendon	51	
Howlett, H., Moonta	27	
"Koonoowarra," Enfield	69	
Hall, A. W., South Oakleigh, Victoria	92	
Convent of the Good Shepherd, Oakleigh, Victoria	6	
Carne, E. A., Kangaroo Flat, Victoria	46	
Navan Poultry Farm, Minlaton	39	
Lillywhite, R. G., Fullarton	61	
Gibbs & Pine, Queenstown	1	
Hughes, J. J., Elsternwick, Victoria	—	
Shamrock Poultry Farm, Perth, W.A.	47	
Bertelsmeier, C. B., Clare	30	
Nancarrow, J. T., Port Adelaide	35	

SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

Robertson, F. H., Northam, W.A.	16
McKenzie, E., Northcote, Victoria	41
Mitchell, B., Bendigo, Victoria	31
Provis, W., Eudunda	64
Kenway, D., West Pennant Hills, Sydney	12
Cowan Bros., Burwood, N.S.W.	44
Kenmore Poultry Farm, Dandenong, Victoria	33
Brundett, S., Moonee Ponds, Victoria	28
Cant, E. V., Richmond	41

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended April 30th.	Total Eggs Laid from April 1st, 1912, to April 30th.
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SECTION II.—HEAVY BREEDS—Continued.

BLACK ORPINGTONS—Continued.

Craig, Mrs. C., Hackney	8	
Lampe, B., Kadina	9	
Wirraparinga Poultry Yards, Plympton	26	
Phillips, A., Portland, S.A.	—	
Martin, B. P., Unley Park	60	
Nancarrow, J. T., Port Adelaide	—	
Padman, J. E., Plympton	45	
Francis Bros., Fullarton	3	
Hall, T. O., Rose Park	53	
Tockington Park Poultry Farm, Grange	9	
Bertelsmeier, C. B., Clare	35	
Craig Bros., Hackney	77	
Bertelsmeier, C. B., Clare	45	

SILVER WYANDOTTES.

Dunn, L. F., Keswick	45	
Tidswell, H. J., Mitcham Park	88	
Moyes, S., Blyth	59	
Perry, Wm., Murrumbidgee, Victoria	—	
"Denehollow," Caulfield, Victoria	29	
Western, F. C., Marion	41	

SALMON FAYEROLLES.

Courtenay, K., Mordialloc, Victoria	69	
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LANGSHANS.

Stevens, E. F., Littlehampton	30	
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PLYMOUTH ROCKS.

"Koonoowarra," Enfield	—	
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SECTION III.—SCRATCHING SHEED SECTION.

WHITE LEGHORNS.

Sickert, P., Clarence Park	35	
Tomlinson, W., Clarence Park	93	
Morits Bros., Kalangadoo	49	
Codling, H., Mitcham Park	41	
Sargenfi Poultry Yards, East Payneham	30	
Purvis, W., Glanville	71	
Bertelsmeier, C. B., Clare	64	
Padman, A. H., Hyde Park	76	
Hocking, E. D., Kadina	40	
Beadnall Bros., Gawler	3	
Brain, J. H., South Yan Yean, Victoria	32	
Provis, W., Eudunda	69	
Redfern Poultry Farm, Caulfield, Victoria	69	
Broderick, P. J., Gawler	—	
"Koonoowarra," Enfield	8	
Lillywhite, R. G., Fullarton	65	
Cosh, A. J., Burnside	43	
Indra Poultry Farm, Freeling	65	
Whitrow, A. J., Knoxville	36	
Tockington Park Poultry Farm, Grange	78	

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended April 30th, 1912.	Total Eggs Laid from April 1st, 1912, to April 30th, 1912.
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SECTION I.—LIGHT BREEDS.**WHITE LEGHORNS (except where otherwise notified).**

Glenelg River Poultry Farm, Mount Gambier	36
Dow, A., Glencoe West	50
McNamara, Mrs., Mount Gambier	33
Moritz Bros., Kalangadoo	103
"Mahama," Mount Gambier	25
Holmes, F. A., Frances	40
Sudholz, A., Kalangadoo	6
Staunton, S., Naracoorte	17
Hall, C. W., Mount Gambier	17
Moritz Bros., Kalangadoo	88
Vorwerk, K. E., Millicent	7
Vorwerk, H. F. & A. C., Millicent	46
Jarrad, J., Mount Gambier	—
Bartram, T. A., Kybybolite	38
Vorwerk, H. F. & A. C., Millicent	23
Jenkins, R. D., Kybybolite	30
Arthur, J. S., Bordertown	44
Drake, C., Naracoorte	11
"Eurimina," Kybybolite	27
Smith, M., Hynam	39
Lacey, F. O., Kybybolite	77
"Herdfield," Mount Gambier	44
Blue Lake Poultry Farm, Mount Gambier	11
Beaton, W. J., Tantanoola	43
Bennett, E., Kalangadoo	20
Jones, H. F., Mount Gambier	—

MINORCAS.

James, S. T., Mount Gambier	12
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SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

"Herdfield," Mount Gambier	4
Blue Lake Poultry Farm, Mount Gambier	21
McNamara, Mrs., Mount Gambier	6

SILVER WYANDOTTES.

Moritz Bros., Kalangadoo	74
Osborne, W. F., Kalangadoo	21

PLYMOUTH ROCKS.

Bishop, B., Mount Gambier	—
Glenelg River Poultry Farm, Mount Gambier	10

D. F. LAURIE, Poultry Expert.

NOTES ON EGG-LAYING COMPETITIONS.

As will be seen from the superintendents' reports below, a fair start has been made at both stations. As in former years, it is again evident that the breeders do not have enough birds from which to make a proper selection. It stands to reason that birds of mixed ages, sizes, and strains cannot give constant nor good returns. The leading breeders as a rule have entered birds uniform in age, quality, and appearance, but the rank and file have contributed mixed pens. Repeated warnings have been issued from this office that pullets in full lay should not be selected. Such birds invariably suffer a check and go into a moult. This retards the progress of the competition, and, of course, seriously affects the final results. The superintendent of Roseworthy Poultry Station reports that chicken pox was introduced by an inter-State pen. The trouble, however, is controlled. Breeders do not exercise sufficient care, and there is a disposition to make light of this disease which, however, may become serious. The Roseworthy report again refers to the discourteous behaviour of a competitor, who has taken no notice of an official communication. I think the least that can be expected is that each competitor will promptly acknowledge all communications concerning his birds. During the next four weeks of the progress of these tests it will be interesting to note the stamina of the birds when colder conditions prevail.

ROSEWORTHY.

The superintendent reports:—"One hundred and thirty-five pens from 136 entries have been received, as follows:—Section 1, open yards, 85; section 2, heavy breeds, 30; section 3, scratching sheds, 20 = 135. The vacant pen is No. 35 in open section. The birds, taken collectively, are a good average lot, but individually some very poor specimens are to be found. The ages again appear to be considerably mixed, which in some cases will not result in benefit to the breeder. One pen in section 3, three pens in section 2, and four pens in section 1 have failed to score. Indications point to an early start. Several pens which had started have gone into a light moult, thus accounting for the break in the scores. The general health of the birds is good; eight pens have shown chicken pox; in some this has been strongly developed; six inter-State pens and two local pens were affected. The trouble evidently arrived with the inter-State birds, as one showed it during the second day of the test, and others during the first week; but the scourge has received a check, and I do not anticipate any further developments. One death occurred during the month, and as this was a very weedy specimen from an infected yard, it will not be much loss. Two hens, after laying a few eggs in the heavy section, decided to go broody; one was returned after four days and the other one is now out; both Black Orpingtons. One hen in section 1 had the misfortune to hurt her leg in some way a fortnight ago, and although the owner was informed, he has not replied to the information, or to the request to replace the bird. Average maximum temperature for the month, 74.4. Average minimum, 37.3. Rain, .91 points. Highest reading, 90.6°; lowest, 37.3°.

KYBYBOLITE.

The Superintendent reports:—"There were 35 pens of various breeds entered, but only 24 have started. The birds arrived in different stages of maturity. Some had laid before their arrival, and others again were backward, while there were a good number of mixed types. The general health has been good, and once they settle down we should have some fair laying. The weather has been fair, though we have experienced some cold winds and dull days. The maximum temperature was 70°, while the minimum was 34°, or as low as last April, though the maximum was not as high. The rain registered was about 1½ in."

D. F. LAURIE, Poultry Expert.

ANALYSES OF FERTILISERS.

The following are further results of analyses made by the Government Analyst (Mr. W. A. Hargreaves, M.A.) of samples of fertilisers taken since the beginning of the year.

Name.	Phosphate.						Nitrogen.	
	Water Soluble.		Citrate Soluble.		Acid Soluble.		Phosphoric Acid, analysed as Tricalcio Phosphate.	
	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Adelaide Chemical & Fertiliser Co., Ltd.—								
“Guano super.” (from Heinrich Bros., Freeing).....	30.51	25.00	4.35	5.00	1.76	6.00	—	—
“Mineral super.” (from Bee & Hill, Saddleworth).....	37.78	36.00	—	—	—	—	—	—
Anders, E., & Son—								
“Victor bonedust”.....	—	—	—	—	—	—	43.75	40.00
Crompton & Son—								
“O.K. Bonedust (from E. & W. Hackett, Adelaide).....	—	—	13.00	44.67	—	—	—	—
Sulphate of Ammonia (E. & W. Hackett, Adelaide).....	—	—	—	—	—	—	—	—
Elder, Smith, & Co., Ltd.—								
“Lew's super.” (from Bee & Hill, Saddleworth).....	36.65	36.00	—	—	—	—	—	—
Hasell, A. H.—								
“Jap” brand super.—								
Ex s.s. <i>Satiss Mary</i>	39.00	38.00	—	—	—	—	—	—
From Heinrich Bros., Freeing	38.38	38.00	—	—	—	—	—	—
Ex s.s. <i>Ethelstan</i>	40.05	38.00	—	—	—	—	—	—
From Bee & Hill, Saddleworth	39.06	38.00	—	—	—	—	—	—
“Hasell's” 2nd grade—								
“Super.” (ex s.s. <i>Ethelstan</i>).....	31.07	31.00	—	—	—	—	—	—
International Fertilisers Co. of A.—								
“A.A.B. Fertiliser”.....	33.26	32.34	—	—	—	—	1.76	1.76

* The discrepancy shown here between the registered guarantee and the result of analysis is due to a clerical error in filling in the form of registration and guarantee, which the manufacturers have given notice to rectify, as required by the Act.

GEO. QUINN, Inspector of Fertilisers.

DEPARTMENT OF AGRICULTURE.

EXPERIMENTAL DRY FARMING PLOTS.

Conducted by Mr. T. GRIFFIN, Hammond.

During the past four years Mr. T. Griffin, of Hammond, has been carrying on a series of experiments to ascertain the effect of various methods of cultivation in districts with a scanty rainfall. Eight plots were laid out, and the variety of wheat sown in each instance was Federation; 60lbs. of mineral super. per acre was drilled in with the seed. The following table sets out the manner in which each plot was cultivated, the respective yields for the past four years, the average yields, and the rainfall from seedtime to harvest during each year :—

No. of Plot.	Method of Treatment.	Yields per Acre, 1898-9.	Yields per Acre, 1899-10.	Yields per Acre, 1910-11.	Yields per Acre, 1911-12.	Average Yield for 4 Years.
		Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.
1	Disked, ploughed 6in. deep, immediately subpacked and thoroughly surface-cultivated during the summer	23 41	19 22	33 37	10 0	21 40
2	Disked, ploughed 6in. deep, thoroughly surface-cultivated during the summer, but not subpacked	20 27	14 49	32 0	9 17	19 8
3	Disked, ploughed 6in. deep, thoroughly surface-cultivated during the summer, and subpacked before sowing	20 54	12 24	31 51	7 43	18 12
4	Disked, ploughed 4in. deep, otherwise same as Plot 1	17 42	14 15	32 38	8 25	18 15
5	Disked, ploughed 4in. deep, otherwise same as Plot 2	14 21	8 57	33 0	8 6	16 6
6	Disked, ploughed 4in. deep, otherwise same as Plot 3	12 22	12 26	32 1	7 21	16 2
7	Ploughed 4in. deep in the autumn and subpacked	14 4	15 12	27 20	3 14	14 57
8	Ploughed 4in. deep in the autumn but not subpacked	12 44	16 31	23 26	2 3	13 41
	Rainfall from seed to harvest....	9.84in.	9.69in.	14.39in.	5.83in.	Avge. 4 years, 9.93in.

Each of these plots was three acres in area. The seed was sown from April 27th to 29th, and the crop harvested from November 16th to 20th.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, April 10th, there being present Messrs. A. M. Dawkins (Chairman), C. J. Valentine, George Jeffrey, G. F. Cleland, J. W. Sandford, Jno. Miller, Chas. Willcox, T. S. Williams, and G. G. Nicholls (Secretary). Professor Lowrie (Director of Agriculture) was also present by invitation of the Board.

JOHN RIDLEY MEMORIAL SCHOLARSHIP.

The Secretary reported that the committee appointed to wait upon Mr. Francis J. Fisher to discuss proposals for the founding of the above scholarship had placed before him certain proposals, which had been approved by him on behalf of his clients, who were the donors of £1,000 for the establishment of the memorial. Subsequently the matter had been brought under the notice of the Government, who had approved the scheme and promised to place a similar sum of £1,000 on the next Estimates, to be handed over to the trustees. The proposals approved are set out as follows :—

“That the £2,000 be handed over to three trustees, who will see that the donor's wishes are complied with. One trustee shall be elected by the Advisory Board of Agriculture, or, in the absence of any Board, by the Minister Controlling the Department of Agriculture. The second trustee shall be elected by the Faculty of Science of the University of Adelaide. The third trustee shall be the Principal of the Agricultural College, *ex officio*. The trustees shall invest the sum donated and make use of the interest towards the purposes of the scholarship. The scholarship shall take the form of an end of year scholarship, to be awarded to the most successful student of the third year at Roseworthy Agricultural College, to enable him to complete his B.Sc. degree in agriculture at the Adelaide University.

“The B.Sc. degree in agriculture is covered in four years, two of which must be spent at the Roseworthy Agricultural College, and two at the Adelaide University. The scholarship would therefore be tenable for two years. As the awarding of the scholarship will necessarily be subject to the leading student's desire to continue his course of studies, in the event of his not wishing to avail himself of the opportunities offered him, the scholarship will be open to those following him in order of merit, subject to the discretion of the trustees. As the scholarship will be available only in alternate years, if, in the opinion of the trustees, there is no acceptable candidate in any given year, it will be open to them to offer it to suitable candidates who may have left the institution in the preceding year, or hold it over for the succeeding year. In the event of a scholarship-holder failing to give full satisfaction

to the University authorities, the scholarship will be withdrawn by the trustees. Should the scholarship, for good cause, not be awarded in any given year, the trustees shall have the right of applying the revenue to some other object directly connected with the institution."

RESOLUTIONS FROM BRANCHES.

Destruction of Diseased Stock.—Resolutions were received from the War-cowie and Cradock Branches disapproving of the destruction of stock without an examination by a qualified veterinary surgeon. The Chief Inspector of Stock said that under the Act only those officers of the department who were duly qualified inspectors or veterinary surgeons could order the destruction of stock. No doubt many cattle in the North suffered from grass-seed tumors, but if they were neglected they sometimes developed into actinomycosis, or lumpy jaw. That morning he had heard of some animals affected with both tuberculosis and actinomycosis. If the owners liked they could have them isolated for treatment, but when cases were bad they preferred to have the affected animals destroyed.

On the motion of Mr. Jeffrey, seconded by Mr. Valentine, it was decided "That the Board considers the Act a good one, and that the certificated inspectors appointed under it are thoroughly qualified to carry out their duties."

Station for Veterinary Surgeon.—A letter was received from the War-cowie Branch stating that one of the best centres in the North-West to station a Government veterinary surgeon would be Hawker. It was decided to forward the communication to the Minister for consideration.

A NEW BRANCH.

The formation of a Branch of the Agricultural Bureau at Greenock was approved, with the following gentlemen as members:—Messrs. A. G. Heinze, V. Koschade, G. O. and R. Tummel, B. Schulz, J. Jungfer, J. C. Jaensch, E. Handke, C. Liersch, A. Nitschke, H. Koch, F. S. Pfeiffer, G. F. B. Nitschke, A. B. Gniel, L. A. Traeger, E. Brockmann, O. Semmler.

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NEW MEMBERS.

The following gentlemen were approved as members of the Branches shown, viz.:—Geranium—D. L. Lithgow, A. Norton; Miltalie—M. Wilson; Whyte-Yarcowie—F. Hunt, W. Taylor; Arden Vale and Wyacca—O. Echert; Mount Remarkable—F. J. Neal; Wilkawatt—F. W. Gasmier, P. Maher; R. Sinclair, B. Tylor; Salisbury—H. E. Judd; Redhill—Rev. H. Holmes, R. Dick, jun.; Mount Barker—I. F. Jackson, A. D. Wilkinson, J. Wolley, L. Hughes, J. Edwards, Jas. Choat, Beavis Bunnnett, J. E. Smith, B. May, C. Wollaston, Fred Follett, Allan Ferguson; Ironbank—J. Morgan, Capt. John Hill, F. S. Coats; Belalie North—T. P. Scholts; Stockport—T. A. Higgins, S. A. Rodgers; Wirrabara—A. Gaul

COMMENTS BY PROFESSOR LOWRIE.

Professor Lowrie, in response to an invitation from the Chairman, spoke briefly of the season's prospects and other matters.

Impressions and Prospects.—He said there was evidence throughout the State of thorough and systematic preparation of the land for seeding. Indeed, in very few places was it otherwise, although here and there, as one moved through the State, he would find that individual farmers had clung to the notion that to work the land in the spring time was the beginning and end of fallowing. They let the fallow become stinkwort clad, when it would have paid them, in a year when retention of moisture in the soil was so essential, to have turned the plants under with an extra working. The plants, perhaps, had their uses, but on the fallow they became so many "pumps," drawing up the moisture reserves from below. The season up to date had not been a promising one, but he was not a weather prophet. All he could say was that if the weather maintained its form of last year and last summer, they might anticipate a rather awkward season. However, there was plenty of time for it to change its form, and abundant time for the farmers to get in their seed under favorable conditions.

Working Light Soil.—The man working light land should avoid being in too great a hurry to get his seeding over. If possible, those with light soil would do well to leave it alone until there had been a good rain over it. There was a lot of that class of land in the new country recently opened up. He had travelled over some of it east of the Murray, and was satisfied that if occupiers worked that class of land "dry" they would meet trouble. They would find the wheat would never develop the vigor it would show on similar land if they had the patience to wait for the rain. Fallowing in the first years of occupation in mallee areas was naturally secondary to shoot-killing; but as soon as these had been got rid of, fallowing should follow in dead-earnest.

Horse-breeding and Cow-testing.—Regarding horse-breeding societies, he was disappointed at the small encouragement the scheme had received from the farmers. Similar societies had put Scotland in the forefront of Clydesdale horse-breeding centres. He warmly commended cow-testing associations, and regretted that dairymen and farmers had not made use of that system of eliminating inferior cattle from their herds. In reply to Mr. Miller, the Professor stated that, as a general thing, he advised farmers in wheat-growing country to stick to wheat, and in ideal barley country to stick to barley.

Professor Lowrie was heartily thanked for his attendance and the remarks, and it was unanimously decided to ask the Government to appoint the Professor to be a member of the Board.

THE WHEAT MARKET.

As a result of depleted stocks and small imports, prices for wheat in the United Kingdom last month again advanced, and this, notwithstanding that the world's visible supply on April 1st was estimated at a much larger quantity than for a number of years past. The improvement was reflected in the local market, where the price advanced to a higher figure than had ruled for some 20 months previously. *Beerbohm's Evening Corn Trade List* of March 29th sets out the position at that date as follows:—"Two-thirds of the season 1911-12 are about over. It was generally estimated early in the season that, owing to the good crops harvested by importing countries last summer, the weekly requirements of foreign wheat for Europe would not exceed 1,100,000 quarters per week. From August 1st, 1911, to March 23rd, 1912, the exports to Europe have amounted to 36,075,000 quarters, and as the total requirements for the whole season were estimated to be 57,200,000 quarters, there would remain a balance of 21,125,000 quarters to be shipped between March 23rd and the end of July (18 weeks), or 1,175,000 quarters per week. If the official crop estimates of exporting countries were correct, there should be little difficulty in obtaining all the wheat necessary; but with regard to the price to be paid for same, much may depend on the progress of the growing crops. The present level of prices is fairly high and 5s. to 7s. 6d. above values at this time last year, but part of this advance is accounted for by the difference in freight rates."

Writing on April 4th the same authority states—"It will be seen by the tabular statement printed below that while the world's visible supply on the 1st April is the largest since 1895, the European portion is distinctly smaller than last year (when, however, it was exceptionally large), and somewhat smaller than in 1910 and in several other years. The Canadian 'visible' forms a much larger proportion of the North American total than in any previous year. The average price of English wheat on the 1st of April, 34s. 4d., is, with two exceptions, 1909 and 1898, higher than in any year since 1895. The deliveries of English wheat to date have been decidedly larger than in the corresponding period of 1910-11, but if the official estimate of the English wheat crop was correct, reserves in farmers' hands are still several hundred thousand quarters larger than at the end of March, 1911.

THE WORLD'S VISIBLE WHEAT SUPPLY ON APRIL 1ST.

	European. Qrs.	U.S.—Canada. Qrs.	Total. Qrs.	Eng. Average. Price. s. d.
1912	9,500,000	14,400,000	23,900,000	34 4
1911	13,370,000	8,215,000	21,585,000	30 3
1910	10,750,000	7,210,000	17,960,000	33 0
1909	9,960,000	8,000,000	17,960,000	36 0
1908	10,700,000	6,550,000	17,250,000	31 4
1907	9,570,000	10,160,000	19,730,000	26 8
1906	9,555,000	8,900,000	18,455,000	28 3
1905	10,635,000	6,170,000	16,805,000	30 9
1904	9,000,000	6,520,000	15,520,000	28 2
1903	6,675,000	9,250,000	15,925,000	25 2
1902	8,645,000	10,125,000	18,770,000	27 2
1901	9,250,000	10,280,000	19,530,000	26 0
1900	8,950,000	10,900,000	19,850,000	25 10
1899	7,950,000	6,950,000	14,900,000	24 11
1898	8,150,000	5,700,000	13,850,000	35 3
1897	7,600,000	7,200,000	14,800,000	27 10
1896	7,850,000	11,620,000	19,470,000	24 7

Date.	LONDON (Previous Day).	ADELAIDE.	MELBOURNE.	SYDNEY.
	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.
April 10	Firm, but quiet; Jan.-Feb., 4/10½	3/9 to 3/9½ ..	3/10 to 3/10½	3/10 to 3/10½
11	Firm, good demand; Mar.-April, 4/9½	3/9½ to 3/10 ..	3/10½ ..	3/10½
12	Firm, held for 8d. advance; Mar.-April, 4/10½; Liverpool, firm, quiet	Do.	Do.	Do.
13	Firm, Jan.-Feb., 4/10½; Liverpool, firm; Feb.-Mar., 4/10½ ..	Do.	3/10 to 3/10½	Do.
15	—	3/10 to 3/10½	3/11 to 3/11½	3/11 to 3/11½
16	Firm, held for 3d. advance; Feb.-Mar., 4/11½; Mar.-April, 4/10½ ..	3/10½ to 3/11½	4/- to 4/0½ ..	4/- to 4/0½
	Liverpool, Feb.-Mar., 5/-	Do.	4/0½	4/-
17	Quiet, easier tendency; Jan.-Feb., 5/0½; Liverpool, April-May, 5/0½	3/10½ to 3/11½	Do.	Do.
18	Quiet, with easier tendency; Liverpool, dull, offered lower ..	3/11 to 4/- ..	Do.	Do.
19	Firm; Jan.-Feb., 5/-; Mar.-April, 5/0½; Liverpool, steady, but quiet	4/-	4/0½ to 4/1 ..	4/0½ to 4/1
20	Held for 3d. advance; Jan.-Feb., 5/0½; Feb.-Mar., 4/9½; April-May, 4/10	Do.	4/-	4/-
22	—	4/- to 4/0½ ..	Do.	Do.
23	Steady but quiet; Jan.-Feb., 5/1 to 5/1½; Feb.-Mar., 5/0½; March-April, 5/-; Liverpool held late rates, no demand	3/11 to 4/- ..	4/- to 4/1 ..	4/- to 4/1
24	Dull, offered lower, no demand ..	Do.	Do.	Do.
25	Dull, easier tendency; Dec.-Jan., 5/0½ ..	Do.	Do.	Do.
26	Steady but quiet ..	3/11½ to 4/-	4/- to 4/1½	4/- to 4/1½
27	Firm, held for 6d. advance ..	4/- to 4/0½ ..	4/1 to 4/2 ..	4/1½
29	—	Do.	4/2 ..	Do.
30	Steady, but quiet ..	4/-	Do.	4/1½ to 4/2
May 1	Dull, with easier tendency, Liverpool dull and neglected	Do.	Do.	Do.
2	—	3/11 to 4/- ..	4/1½ to 4/2½	4/2½ to 4/3
3	Dull, and offered lower ..	Do.	4/3 ..	Do.
4	Very slow to sell, rather easier ..	Do.	Do.	Do.
6	—	4/-	4/3 to 4/3½ ..	Do.
7	Steady, but quiet, Feb.-March, 5/0½; March-April, 4/11½; Liverpool, firm, held higher	4/-	4/3 to 4/3½ ..	Do.

STEAMER FREIGHTS.—(May 2nd).—Steamers from South Australia to United Kingdom—Continent, full cargo rates 32s. 6d. per ton (10½d. per bush.) nominal. Parcels, Port Adelaide to London—Liverpool or Continent, 30s. per ton (9½d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SAILER FREIGHTS.—From South Australia to United Kingdom—Continent, 30s. to 32. 6d. per ton (9½d. to 10½d. per bush.); to South Africa, 25s. to 27s. 6d. per ton (8d. to 8½d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for April, 1912, at the undermentioned stations, also the average total rainfall for the first four months in the year, and the total for the four months of 1912 and 1911 respectively:—

Station.	For April, 1912.	A'v'ge. to End April.	To End April, 1912.	To End April, 1911.	Station.	For April, 1912.	A'v'ge. to End April.	To End April, 1912.	To End April, 1911.
Adelaide	1.75	4.37	2.96	2.66	Hamley Bridge	0.47	4.04	1.30	2.84
Hawker	—	2.64	2.17	1.35	Kapunda....	0.50	4.36	1.44	3.81
Craddock.....	—	2.71	1.40	1.01	Freeling.....	0.61	4.05	1.65	3.90
Wilson.....	—	2.82	2.80	0.62	Stockwell	0.56	4.42	1.87	4.15
Gordon.....	—	5.76	1.96	1.12	Nuriootpa ..	0.83	4.52	1.85	2.97
Quorn.....	—	2.85	4.11	1.06	Angaston ...	0.73	4.43	2.21	4.36
Port Augusta	0.01	2.64	2.25	1.48	Tanunda ...	1.28	4.69	3.30	4.86
Port Germein	0.40	3.21	1.28	2.79	Lyndoch ...	1.02	4.64	2.48	2.72
Port Pirie ...	0.17	3.29	1.05	3.19	Mallala	0.63	4.02	1.61	2.05
Crystal Brook	0.42	3.43	1.72	3.02	Roseworthy .	1.15	4.07	2.05	2.50
Pt. Broughton	0.49	3.41	2.64	2.92	Gawler.....	1.18	4.28	2.18	2.77
Bute.....	0.35	3.41	1.67	4.11	Smithfield ..	0.98	3.80	1.83	2.98
Hammond ..	—	2.88	1.49	3.48	Two Wells...	0.70	3.94	1.70	1.84
Bruce.....	—	2.17	1.89	0.84	Virginia.....	0.62	4.03	1.83	2.21
Wilmington .	0.04	3.68	3.37	4.09	Salisbury....	0.83	4.25	2.17	3.73
Melrose.....	0.18	4.98	2.69	4.61	Teatree Gully	1.24	6.27	2.99	3.20
Booleroo Cntr	0.02	3.47	1.38	1.60	Magill.....	1.13	5.56	3.04	3.45
Wirrabara...	0.16	3.91	1.73	2.21	Mitcham	0.67	4.89	2.75	3.86
Appila.....	—	3.66	1.21	2.05	Crafers.....	1.73	8.80	5.25	6.48
Laura.....	0.12	3.83	1.20	2.82	Clarendon ..	1.92	6.86	3.64	5.21
Caltowie....	0.15	3.70	1.27	2.82	Morphett Vale	0.96	5.18	1.86	3.93
Jamestown ..	0.35	3.65	2.12	3.16	Noarlunga...	0.93	4.38	1.56	3.94
Gladstone ..	0.18	3.51	1.05	3.15	Willunga ...	1.68	4.92	2.70	4.70
Georgetown .	0.66	4.06	1.89	3.24	Aldinga.....	0.90	4.64	1.74	2.65
Narridy.....	0.46	3.88	1.57	2.79	Normanville..	0.82	4.06	1.76	3.58
Redhill.....	0.20	3.57	2.04	2.64	Yankalilla...	1.44	4.71	2.59	3.49
Koolunga....	0.09	2.61	1.45	2.71	Eudunda.....	0.42	3.59	2.55	3.71
Carrieton...	—	2.71	1.34	0.78	Sutherland...	0.14	—	2.10	1.76
Eurelia.....	—	2.95	1.94	1.67	Truro.....	0.31	4.09	2.24	3.90
Johnsburg...	0.03	2.14	1.54	1.07	Palmer.....	0.26	—	1.73	3.42
Orroroo.....	—	3.47	1.82	0.93	Mt. Pleasant.	0.62	5.16	1.87	4.08
Black Rock ..	—	3.10	1.17	1.19	Blumberg ...	0.75	5.78	2.56	4.31
Petersburg ..	0.10	3.22	2.23	1.97	Gumeracha ..	1.04	4.99	3.20	5.23
Yongala.....	0.13	3.14	1.36	1.95	Lobethal ...	1.07	6.27	3.38	4.08
Terowie.....	0.17	3.17	1.60	2.79	Woodside....	0.70	5.57	3.13	4.09
Yarcowie....	0.32	3.19	1.94	2.62	Hahndorf ...	0.93	6.29	2.80	6.14
Hallett.....	0.15	3.45	1.47	2.86	Nairne.....	0.69	5.69	2.75	6.38
Mount Bryan	—	3.01	1.56	2.72	Mount Barker	0.73	5.70	2.68	4.95
Burra.....	0.18	3.72	1.63	3.59	Echunga.....	1.13	6.15	3.48	5.37
Snowtown...	0.25	3.46	2.21	2.36	Macclesfield..	0.92	5.74	2.88	4.97
Brinkworth..	0.07	3.15	1.19	2.99	Meadows.....	1.52	7.07	3.54	6.31
Blyth.....	0.34	3.75	1.85	2.74	Strathalbyn..	0.68	3.93	2.88	3.86
Clare.....	0.40	5.00	2.51	3.89	Callington...	0.35	3.70	1.44	2.75
Mintaro Cntrl.	0.28	4.14	1.76	4.09	Langhorne's B.	0.27	3.56	1.46	2.39
Watervale...	0.44	5.54	2.73	5.44	Milang.....	0.68	3.83	1.72	1.76
Auburn.....	0.57	5.08	2.55	4.49	Walleraro ...	0.44	3.23	2.25	2.48
Manoora.....	0.30	3.75	1.99	2.69	Kadina.....	0.25	3.71	2.33	2.55
Hoyleton....	0.20	4.27	0.96	4.42	Moonta.....	0.80	3.56	2.57	3.03
Balaklava ..	0.40	3.90	1.44	3.95	Green's Plains	0.12	3.26	1.41	2.34
Pt. Wakefield	0.23	3.57	1.94	6.05	Maitland ...	0.70	4.05	2.06	4.47
Saddleworth	0.48	4.53	2.03	2.53	Ardrossan ..	0.33	3.08	2.39	2.51
Marrabel ...	0.21	4.18	1.41	2.12	Pt. Victoria..	0.80	3.18	2.47	3.38
Riverton ...	0.41	4.46	1.73	3.60	Curramulka..	0.40	3.67	2.45	3.01
Tarlee.....	0.50	4.06	1.99	2.55	Minlaton ...	0.52	3.42	2.28	2.76
Stockport ...	0.74	3.86	1.74	2.44	Stansbury ..	0.62	3.45	2.83	2.32

RAINFALL TABLE—*continued.*

Station.	For April, 1912.	Av'ge. to End April.	To End April, 1912.	To End April, 1911.	Station.	For April, 1912.	Av'ge. to End April.	To End April, 1912.	To End April, 1911.
Warooka ...	0.51	3.02	2.39	4.51	Bordertown..	0.47	4.06	1.16	4.23
Yorke town ..	0.62	3.27	2.89	3.38	Wolseley ...	0.42	3.73	0.69	3.61
Edithburgh..	0.61	3.46	2.50	2.37	Frances	0.85	3.95	2.24	5.19
Fowler's Bay	0.34	2.44	1.98	1.66	Naracoorte ..	1.44	4.41	3.14	5.25
Streaky Bay.	0.16	2.85	1.90	1.99	Lucindale ...	2.63	4.34	3.76	5.54
Pt. Elliston..	0.20	2.63	2.26	2.13	Penola	3.20	5.24	6.17	7.42
Pt. Lincoln..	0.62	3.64	5.85	2.39	Millicent	2.87	5.88	5.43	8.16
Cowell	0.61	3.15	3.60	1.34	Mt. Gambier.	3.48	6.54	6.85	8.83
Queenscliffe..	1.04	3.24	3.31	—	Wellington ..	0.64	3.75	1.34	3.81
Port Elliot...	1.11	4.35	2.98	2.46	Murray Brdg.	0.20	3.61	0.81	3.05
Goolwa	1.51	3.85	3.29	3.86	Mannum	0.17	3.11	0.98	1.85
Meningie ...	0.99	3.90	2.29	3.07	Morgan	0.05	2.36	1.05	2.85
Kingston....	2.19	4.58	4.06	4.94	Overland Crnr.	—	3.07	1.06	4.25
Robe	2.02	4.46	3.74	6.01	Renmark....	—	2.69	1.21	4.69
Beachport...	1.88	5.21	3.65	6.78	Lameroo	0.48	—	1.02	1.33
Coonalpyn...	0.81	3.76	1.71	3.61					



TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of 6,000 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on May 4th—

BUTTER.—The weather conditions, together with the period of the year, militates against a good supply of cream, but what has been coming in lately has been of good quality. Prices have fallen during the month, the present prices being—Superfine, 1s. 4½d.; pure creamery, 1s. 3½d.

A. W. Sandford & Co., Limited, report on May 1st—

BUTTER.—The cooler weather enabled dairy folk to make their butters and market their cream in a decidedly better condition than during the former month, so that where the standard of quality was maintained full rates ruled. Medium grades of factory and creamery, however, were disposed at times to drag. Best factory and creamery, fresh in prints, sold at from 1s. 2½d. to 1s. 4d.; choice separators and dairies 1s. 1½d. to 1s. 3d.; store and collectors, 11d. to 1s.

EGGS.—A good healthy market ruled throughout, this being due to extensive operations both for S.A. and export trade. Prime guaranteed new-laid steadily advanced in price, selling at—hen, 1s. 5½d. per dozen; duck, 1s. 6d.; cold stored at 1s. 1½d. per dozen, and well pickled sorts very saleable at 1s.

CHEESE experienced another month's brisk business, and with stocks light prices were disposed to further advance. Quotations, 8½d. to 9d. per lb.

BACON AND HAMS.—Curers of established and well-known brands of factory sides and middles found a very ready sale for their consignments, and prices consequently firmed. Sides, 8d. to 8½d.; hams, 10d. to 11d.

HONEY.—The season bids fair to be an active one in this line. Buyers are purchasing freely of all forwardings of choice clear extracted, for which prices held, but off-flavored and discolored lots sold accordingly. Values—Prime, 3d. to 3½d.; secondary, 2d. to 2½d.; beeswax, 1s. 2½d.

ALMONDS.—The rooms are kept cleared under the influence of local and export buyers. Quotations are—Brandis, 6d.; mixed soft shells, 5½d.; kernels, 1s. 1½d. per lb.

LIVE POULTRY.—The yardings throughout the month were heavy and buyers operating extensively for all coops of well-conditioned birds for their Easter and other requirements, good rates ruled. Poor and fattening sorts experienced the usual difficulty in selling. Good table roosters fetched 2s. 9d. to 3s. 7d.; hens, 1s. 7d. to 2s.; cockerels, 1s. 6d. to 2s. 6d.; ducks, 1s. 9d. to 3s. 1d.; geese, 3s. 6d. to 4s. 6d.; pigeons, 9½d. to 10½d.; turkeys, 8½d. to 10½d. for prime; poor and fattening sorts, 3½d. to 5d. per lb. live weight.

POTATOES.—Under the influence of a heavy inquiry the early Gambiers were exhausted, and we are now on to the main crop; but as locals are also coming along from the late districts in the hills, the market is inclined to ease. Quotations—Gambiers, £5 12s. 6d. to £6 10s. on trucks, Mount Gambier.

ONIONS.—It is now quite certain that the yield is a light one, and as the demand keeps brisk prices are firm at—Gambiers, £11 10s. to £12 5s. per ton on trucks, Mount Gambier.

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		May.	June.			May.	June.
Amyton	1055	—	—	Minlaton	*	25	29
Angaston	1064	25	29	Mitchell	*	25	29
Appila-Yarrowie	*	—	—	Monarto South	1075	1	—
Arden Vale & Wyaoeca	1055	—	—	Monteith	*	—	—
Arthurton	*	—	—	Moonta	*	—	—
Balaklava	*	—	—	Moorlands	1077	—	—
Beetaloo Valley	1059	—	—	Morchard	*	—	—
Belalie North	†	25	29	Morgan	†	25	—
Blyth	1065	28	25	Morphett Vale	1085	—	—
Bowhill	*	—	—	Mount Barker	1085	30	27
Bowmans	*	30	27	Mount Bryan	†	25	29
Bute	1071	—	25	Mount Bryan East	1081	4	8
Butler	*	—	—	Mount Gambier	1089	—	—
Caltowie	*	25	29	Mount Pleasant	1085	10	14
Carrieton	1056	30	27	Mount Remarkable	*	29	26
Cherry Gardens	1079	28	25	Mundoora	†	—	—
Clare	*	31	28	Nantawarra	†	29	26
Clarendon	*	27	24	Naracoorite	1092	11	15
Colton	1071	25	29	Narridy	*	—	—
Coomooroo	1056	1	1	Narrung	1093	—	—
Coonalpyn	1075	—	—	Northfield	1067	7	25
Coorabee	1072	25	29	Parilla Well	1077	—	—
Craddock	*	—	—	Parrakie	1077	4	1
Crystal Brook	*	—	—	Paskerville	*	30	27
Cummins	*	25	29	Penola	1094	4	1
Davenport	†	—	—	Penong	*	11	8
Dawson	1057	—	—	Petina	*	—	—
Dingabledinga	*	10	14	Pine Forest	1071	28	25
Dowlingville	*	—	—	Pinnaroo	*	—	—
Elbow Hill	1072	—	—	Port Broughton	*	31	28
Forest Range	*	30	27	Port Elliot	*	18	15
Forster	*	18	15	Port Germein	1061	—	—
Frances	*	24	28	Port Pirie	1061	4	1
Freeling	1065	—	—	Quorn	1057	—	—
Gawler River	1067	—	—	Redhill	1092	28	25
Georgetown	†	25	29	Renmark	*	—	—
Geranium	*	25	29	Riverton	1068	—	—
Green Patch	1072	27	24	Saddleworth	1069	17	21
Gumeracha	*	27	24	Salisbury	1070	7	4
Hartley	1081	25	—	Shannon	*	—	—
Hawker	†	27	29	Sherlock	*	—	—
Hookina	1057	—	29	Stockport	1070	31	28
Ironbank	1081	31	28	Strathalbyn	†	27	24
Kadina	*	28	25	Sutherlands	*	—	—
Kalangadoo	*	11	15	Tatiana	1095	4	1
Kanmantoo	1081	25	29	Uraidla and Summert'n	†	0	3
Keith	1087	25	29	Utera Plains	1074	25	29
Kingscote	1082	7	3	Waikerie	*	—	—
Kingston	*	25	29	Warcovie	1058	—	—
Koppio	1073	30	27	Watervale	*	—	—
Kybybolite	1088	30	27	Weropie	1068	—	—
Lameroc	*	—	—	Whyte-Yarrowie	1063	—	—
Leighton	†	—	—	Wilkawatt	1078	—	—
Lipson	*	—	—	Willowie	*	17	21
Longwood	1082	29	26	Willunga	*	4	1
Lucindale	*	—	1	Wilmington	*	—	—
Lyndoch	1083	—	—	Wirrabara	1059	—	—
MaeGillivray	1083	—	—	Wirrega	*	—	—
Maitland	*	2	6	Woodside	*	—	—
Mallala	*	6	3	Yabmana	1074	—	—
Mannum	*	25	29	Yadnarie	1074	25	29
Meadows	*	—	—	Yallunda	*	—	—
Meminge	*	25	29	Yongala Vale	1064	25	29
Milliecent	1088	14	11	Yorke town	*	11	18
Miltalie	1073	25	29				

* No report received during the month of April. † Only formal business transacted at the last meeting.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Amyton, April 2.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. T. O'Donoghue (chair), R. Brown, T. Ward, D. P. Aitken, S. Baumgurtle, E. C. Mills, H. K. Gum, and A. Crisp, (Hon. Sec.).

BREEDING AND FEEDING PIGS.—Mr. S. Baumgurtle read a paper, in which he stated that to be profitable, pigs required considerable attention. They should be kept clean and dry, and fed regularly. The young pig should be at least six weeks old before it was taken from the sow, after which time it should receive feed three times a day. For fattening the animal should be confined in a clean sty, not too small, and fed on crushed field peas, pollard, wheat, or barley. The peas would be found to fatten quicker, and would produce a nice sweet meat. Where pigs were raised on a large scale, rye, rape, lucerne, etc., should be grown. It would generally be found that pigs paid the dairyman much better than calves. The best breed for bacon was the Berkshire-White Yorkshire cross. The flesh of the former was soft for curing, and that of the latter somewhat hard, but the cross produced a nice flavored bacon.

QUESTIONS FROM CONGRESS FOR OPINION.—

Feighing Wheat in Bulk.—The following paper, written by Mr. J. Kelly, and former member, now resident in New South Wales, was read:—"There are Government weighbridges at nearly all the railway stations in New South Wales, and the bulk of the wheat is weighed on them. There is an advantage in this in more ways than one. In the first place, the weighing is done in less time than by weighing each bag separately. Secondly, you may lose a few lbs. on a load of 80 or 90 bags, but on the other hand you very probably do lose from 1 lb. to 1 lb. on every bag, especially in windy weather. Only a few minutes are necessary in order to weigh your load on the weighbridge. You can pull in to the stack and have a good portion of the load off in the time that it would take to get the table and scales ready. I would advise every Branch to spare no effort to have this system adopted." Members expressed the opinion that if the system were working satisfactorily in New South Wales it certainly should be adopted in this State.

Arden Vale and Wyacca, April 1.

(Average annual rainfall, 16 in.)

PRESENT.—Messrs. J. H. Willis (chair), J. Absalom, W. Fricker, H. Liebick, M. Eckert, A. Stokes, E. W. J., and T. Klingberg, P. Greer, P. A. Hannemann, O. E. Hannemann (Hon. Sec.), and four visitors.

SEEDING OPERATIONS.—Mr. P. A. Hannemann read a paper on this subject. He had found that wheat sown in April, or in the beginning of May, on well-worked fallow, provided there was sufficient moisture to cause the seed to germinate immediately, had given the best returns in either good or bad seasons. He advocated the sowing of about 50lbs. of seed and 40lbs. of super. to the acre, when grain was required, but where hay was to be cut the sowing should be somewhat heavier.

Carrieton, March 28.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. E. W. Radford (chair), M. Manning, C. T. Fisher, F. Vater, W. Beerworth, T. Williams, and J. W. Bock (Hon. Sec.).

WILD DOGS.—Mr. E. W. Radford drew attention to the fact that wild dogs in the district were rapidly increasing in numbers, and they were doing a great deal of damage amongst sheep. Some landholders who had gone to the trouble of putting up high wire-netting fences, found that the dogs bit through the wire.

DUTY ON IMPORTED SUPERPHOSPHATE.—The Branch passed a resolution strongly condemning the proposal to impose an import duty on superphosphate.

Carrieton, April 25.

(Average annual rainfall, 11½ in.)

SHEEP FOR THE FARM.—The following paper was read by Mr. G. M. Williams:—“On farms of over 2,000 acres in area sheep are necessary to keep the land clean. As our rainfall is uncertain and the climatic conditions are not suitable for fat lamb raising, we should go in for the Merinos. Great care should be taken in selecting the ewes to form the foundation of the flock. Large-framed ewes of good quality should be procured. Buy them in the wool, as it is then easier for the average farmer to distinguish between good and inferior sheep. Sheep showing any decrease in length or density of the back wool should be avoided, and there should also be a good fleece on the ribs down to the underline. The belly wool should be similar in quality and quantity to that of the sides. Carefully avoid Merino sheep with black spots on their ears and noses, as these are signs of bad breeding. If breeding is to be carried on, rams of good quality should be mated with the ewes. They should be left with the ewes for about 10 weeks, as this gives time for ewes that may have missed in the early part to come on again. Lambing should start about the first of May, and the ewes should have a reserved paddock with plenty of feed in which to rear their lambs. If dingoes and foxes are troublesome, and the sheep have to be yarded, wethers are more profitable than ewes and lambs, as the loss occasioned by driving the latter about is a serious one.”

Coomooroo, April 1.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Berriman (chair), H. Avery, M. Robertson, E. C. Brice (Hon. Sec.), and one visitor.

IRRIGATION AND LUCERNE.—The paper read by Mr. R. C. Sharp at the Upper North Conference, and printed on page 834 of the March issue, was discussed. Members agreed that the quantity of water allowed blockers in connection with the Pekina scheme was insufficient for them to secure the best results. Many bare patches were noticed in some of the crops, and it was thought that the soil should be analysed for the purpose of ascertaining the cause of these patches. Mr. Avery said it would pay every farmer in the district who could secure the necessary water to put down lucerne, even if only one acre were planted. It was estimated that an acre of lucerne would carry four head of big stock for the year. The Hon. Secretary said lucerne could be cut six or seven times during the summer, and could be stacked as hay or fed as ensilage. Hay and lucerne chaff mixed made an excellent ration for horses.

WATER CONSERVATION.—The Hon. Secretary expressed a preference for dams for storing water where a good holding ground could be obtained. Where tanks had to be sunk he would scoop them out with the plough and scoop, and build with the ends sloping. A coarse concrete made from rubble, taken from the tank, mixed with lime, could be used

for lining. This should be dressed with a good coat of cement. Stone troughs were most suitable where there was well water, but with tanks a good galvanized trough was best. Mr. Berriman thought wooden troughs were the most serviceable. The cement was very likely to be knocked off the stone troughs unless well protected, and the side wall would be found rather wide for lambs.

Dawson, March 30.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. E. W. Smart (chair), T. R. Hughes, C. H. Meyers, P. Quinn, C. Burden, P. H. Baker, and J. Nottle (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—The proposal that the system of selling cattle by live weight should be introduced was discussed at length. It was thought that the seller would not be in any way benefited, and members did not favor the suggestion.

PREPARATION OF LAND FOR SOWING.—Mr. Baker, in initiating a discussion on this subject, stated that his practice was to first scarify or cultivate the land, then sow it with the drill, and cross harrow. With stubble land he would first sow the seed, cultivate it, and then harrow it. Mr. Meyers always sowed his stubble land first, but he did not believe in burying the seed too deeply. He cultivated his fallow prior to drilling in the seed and then cross harrowed it. He had found that where the seed was broadcasted before the land was worked the ants carted the wheat into heaps, and it came up in patches. When he had finished drilling he would harrow out the drill marks. The Chairman did not believe in ploughing in straw, as it would not make a good seed-bed. All fallow should be harrowed after every rain, for the purpose of assisting in the conservation of the soil moisture. There was more danger of the wheat malting when it was sown with the drill, but it withstood the wind better than when broadcasted.

Hookina, March 30.

PRESENT.—Messrs. B. Sheridan (chair), P. Kelly, J. Henschke, L. Woods, P. Murphy S. Stone, D. Madigan (Hon. Sec.), and one visitor.

PICKLING SEED WHEAT.—A discussion was initiated by the Hon. Secretary, who stated that with a season similar to the present, after the rain which fell in March, there was a certain amount of moisture in the ground, which, although not sufficient to start the wheat, caused the bunt spores to germinate. These, having nothing on which to feed, died, and he attributed the fact that comparatively dry sown crops were more free from bunt than later sown crops to this. The disadvantage attending the sowing of bluestone-pickled wheat under dry conditions was that the bluestone tended to draw moisture and cause the seed to rot. He would, therefore, sow unpickled seed in dry weather, but would prefer to have his seed from grain which had been pickled the previous year. Members generally concurred, but Mr. Murphy thought it advisable to always pickle seed a few days before sowing.

Quorn, March 4.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. R. Thompson (chair), Noll, Brewster, Bury, Cook, McColl, and Patten (Hon. Sec.).

MORE MANURE.—Mr. Brewster expressed the view that better results would be obtained from the land in the district if heavier dressings of super. were applied. His practice was to use 60 lbs. to the acre, but that was not enough. Mr. McColl sowed ½ cwt. per acre. With a heavier dressing in a dry season the crop was liable to blight. He did not favor manuring stubble, but the application of phosphates to fallow resulted in a much better stooling of the crop. Mr. Noll put on ½ cwt. to the acre, and found that with cold weather, when unmanured crops were at a standstill, the manured wheat would continue growing. He would not manure stubble land.

Warcowie, April 2.

PRESENT.—Messrs. Thos. Donnellan (chair), Ryan, Bennett, Taylor, Telfer, Jas. Duffy, W. Crossman, P. Donnellan, and J. Feineler (Hon. Sec.), and five visitors.

GRASS SEEDS IN CATTLE.—A lengthy discussion took place with reference to cattle affected with what was commonly known as "grass seeds." Members stated that each year the trouble was getting more common. Four or five years ago it was a rare thing to hear of cattle being affected, and it was also noted that during the last four or five years a grass, which was known in the North as "black grass," had grown in abundance, and each succeeding year it was more plentiful. The seeds of this grass penetrated into the jaws of the cattle, and also into the butt of the tongue, causing tumors or swellings. These tumors sometimes discharged, and later no swellings were noticeable. In other cases there was no discharge, but the lump became hard. In both cases the cattle continued to do well. Cows reared good healthy calves, which were in no way diseased. Several members stated they had cattle affected with grass seeds, and had lanced the swellings, which discharged blood and other matter. Other lumps which presented a hard appearance had been cut out. Members knew of cattle that had been affected with grass seeds, and had been fattened and sent to the Adelaide market, and had passed the inspectors there. Members generally agreed that grass seeds did not bring about an infectious or contagious disease, and thought that it was folly to destroy cattle so affected. It would be more satisfactory to stockowners if three veterinary surgeons were to confer before any animal suffering from a doubtful or a supposed disease was destroyed or ordered to be destroyed. The following resolution was carried unanimously:—"That in the opinion of this branch no stock inspector, except a qualified veterinary surgeon, holding the diploma as such, should have authority to destroy stock."

[This report was shown to Mr. T. S. Williams, the Chief Inspector of Stock, who, in response to our request, has supplied the following comments:—"The nature of abscess and tumors caused by grass seeds is fully understood by the qualified stock inspectors. This kind of thing is not confined to the Warcovie district, as cattle all over the State develop similar lesions. Hundreds of cattle have been treated by the inspectors, or on their advice, and recovery has generally followed. It is when cattle become badly affected with "lumpy jaw" (actinomycosis) that action is taken, and properly so, by the inspector. Where the animals are fat, slaughter for meat, under inspection, is permitted; but if a beast is a "waster" from "lumpy throat," "lumpy jaw," or tuberculosis, the owner is required to isolate or destroy. The Acts and regulations prohibit the use of cows affected with actinomycosis, tuberculosis, or any manifestation of these diseases which, in the opinion of the inspector, renders them unfit for milking purposes. Cattle destroyed in the northern districts (Wilson, &c.) which had tumors about the necks (tubercular glands) were badly affected with tuberculosis of the lungs. On no account will the inspectors allow cows or other cattle to mix with milch cows while they are suffering from open abscess or tumor from which pus is being discharged; the chief reason for this being that flies which settle on the pus carry contagion to the milk, &c. I am quite satisfied, from the reports I have had, that all the cases of so-called "lumpy cattle" in the districts referred to are not entirely due to grass seeds, any more than is the case in other parts of the State. The proper course for the cattleowners in the Warcovie district to follow is to comply with clause 19 of the Stock Diseases Act, and within 24 hours from the time they discover disease (lumpy conditions) in their stock, report to the nearest inspector, and the Chief Inspector of Stock, at Adelaide, when their animals will be inspected and advice given. The inspectors are not out to destroy cattle unnecessarily, and are quite capable of dealing with the class of complaint referred to. "Lumpy jawed" animals are not allowed to be sold through saleyards, and owners exposing diseased stock for sale are liable to a penalty. My advice is that the stockowners take the inspectors into their confidence, as I am sure they will have nothing to complain about if they do so. I hope to visit the district at an early date for the purpose of investigating cases of the nature referred to."—EDITOR.]

Wepowie, April 5.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. C. Halliday (chair), J. Crocker, W. Hetzel, J. Chrystall, J. and T. F. Orrocks (Hon. Sec.)

QUESTIONS FROM CONGRESS FOR OPINION—

Weighing Wheat in Bulk.—The proposal that the system of weighing wheat in bulk should be substituted for that at present in vogue was duly considered. Members

thought the change would result in more convenience for the farmers, but the weigh-bridges should be under the control of the Government.

PICKLED OR UNPICKLED SEED.—Members were agreed that it was advisable to pickle seed, whether the land was dry at the time of seeding or not.

NOXIOUS WEEDS.—The paper contributed by Mr. Giles, of the Mount Remarkable Branch, printed on page 847 of the March issue, was read. Mr. Crocker said that under existing legislation it was impossible to enforce the destruction of the weeds. Members thought it advisable that the Act should be amended so as to give power to local bodies to destroy weeds and collect the cost from the landowners as a first charge against the land.

Wirrabara, April 6.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. P. J. Curnow (chair), J. Kendrick, E. J., W., and W. H. Stevens, H. and P. Lawson, C. F. H. Borgas, J. F. Pitman, A. E. Stott, P. R. Hoskins, C. H. Curnow, C. J., and E. Hollett, A. R. Woodlands (Hon. Sec.), and several visitors.

JERSEY AS A FARMER'S COW.—An article under this heading, culled from a stock journal, was read by Mr. Lawson. Reference was made to the results of milking trials held in various countries, which showed the milking capacity of the Jersey, and the ability of this breed to produce butter-fat on a less costly ration than that necessary for the Shorthorn or other breeds. The value of the carcass of the Jersey to the butcher was much smaller than that of the larger cows, but where she yielded well for several years and paid a good profit to her owner he could afford to lose the few pounds on the carcass. The farmer who kept the Shorthorn breed made a practice of selling the majority of his cows for slaughter at an age when the Jersey was in her prime, and he replaced them by heifers, or by purchased cows, which involved some risk and which did not at all times prevent some loss. The average yield of the Jersey, also, was smaller than that of the large breeds, but what was lost in volume was more than gained in weight of solids. There were, however, Jerseys which yielded 800galls. to 1,000galls. and produced 450lbs. to 550lbs. of butter in the year, and where such cows were collected in a herd there could be no question of success.

EARLY GREENFEED.—Members generally agreed in the opinion that barley was the most suitable crop to grow for early greenfeed.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, March 28.

PRESENT.—Messrs. A. H. Jacobie (chair), Burton, Thyer, Bartrum, Ryan, Curtin, C. Cox, Bartrum (Hon. Sec.)

BARLEY V. WHEAT FOR GREENFEED.—Members generally agreed that King's Early wheat was more suitable for growing as early greenfeed than barley. It grew quickly and stock took it readily.

POTATO CULTIVATION.—The following paper was contributed by Mr. J. Burton:—"Potatoes may be grown successfully in various soils and localities, but they do best in fresh loamy land and in a cool climate. Deep and thorough cultivation is essential in order to obtain large crops, and a little extra labor spent in this way is a good investment. The land should be moderately enriched, well-decayed stable manure being the best dressing for the purpose. It is not advisable to use fresh or rank manure, which is too forcing, causing over-luxuriant growth of the tops at the expense of the roots. Guano

and bonedust may be used in moderation in the absence of farmyard manure, or in combination with it; but, as a rule, the application of rich manures should be avoided, as though by their use heavier crops may be obtained, the quality of the tubers is inferior to those produced in poorer land, and they will not keep so well. Potatoes will vary greatly in quality according to the soil and the place in which they are grown. In alluvial or very rich soil, though the crop may be large and the tubers fine, they have a tendency to become hollow in the centre, and the skin is often scabby. The plants are also inclined, in rich soil, to make too much growth of top at the expense of the tubers. Any variety grown in wet, heavy soil is likely to become waxy through the tubers absorbing an undue proportion of water. When grown in lighter and drier soils they contain an extra quantity of starch, which causes them to be more mealy. The potato should be planted in drills from 2ft. to 2ft. 6in. apart, according to the richness of the soil and strength of the variety. In the rows the sets should be from 10in. to 12in. apart, and covered to a depth of 5in. in light soils and a little less in those of a heavier nature. The earliest crops may be planted at the beginning of August, a dry and warm situation being chosen for them. The later kinds may be planted in September for main crops. In some districts it is usual to plant the main crops about February, so that they will get the full benefit of the late summer and autumn rains. By adopting this plan the plants generally make continuous steady growth after starting, and are not so liable to be checked by dry weather as when put in the ground earlier. Very good autumn crops may be obtained in the milder districts, the Kidney varieties as a rule being best adapted for this purpose. They may be planted at the latter end of January, during February, and up to the middle of March, but it is not advisable to wait until the last-mentioned date if it is convenient to plant earlier. During the growing period weeds should be kept down and the surface soil stirred lightly occasionally, more especially after heavy rains. When the plants are about 6in. high the usual plan is to earth them up by drawing a few inches of soil from between the rows. Some growers, however, object to the practice of earthing up, more especially in dry seasons, on the grounds that the roots that are near the surface are injured by the hoe or plough, as the case may be, and that the soil dries up quicker." Members thought the general neglect of this product as a side line was attributable to the heavy frosts to which this district was subjected.

Beetaloo Valley, April 24.

PRESENT.—Messrs. A. H. Jacobie (chair), Bartrum, Woolford, Curtin, C. and S. Cox, Ryan, Bartrum (Hon. Sec.); and one visitor.

BULLOCKS v. HORSES.—This subject was dealt with in a paper by Mr. S. Cox. He stated that a team of 12 bullocks, valued at £9 per head, would provide for themselves for nine months out of the twelve, if paddocks were available, but it would be necessary to give them hay for the three winter months. The cost of the hay should be about £20 per annum. They required much less attention than was necessary in the case of horses. A team of eight horses, which would be about equal to the strength of the 12 bullocks, would cost, at £30 per head, £240. The 12 months' supply of hay would cost about £110, oats £15, wagon harness about £12 10s., swings and chains £3. The horses were much more suitable for ploughing and cultivating, and the bullocks were practically useless for stripping, but it would be found that they were very valuable in connection with the cartage of wheat. Generally, however, the horses were best for farm work and bullocks for carting.

ORCHARD WORK.—The following paper was read by the Chairman:—"An orchardist should make his fences rabbit-proof with not less than 3ft. 6in. netting, as it is useless to plant young trees without duly protecting them where rabbits are plentiful. Old trees need the same care, for in the summer, when green feed is scarce, rabbits will soon make a good orchard an eye-sore. At this period of the year we should place the manure around the trees, to be dug in later on. If an orchard is situated on a hillside, it is advisable to plough it across to steady the water from rushing through. Should it be on low-lying ground it is advisable to drain it, and not have pools of water lying around the trees. After this is done, and the sap is well down, we can start pruning. Every man seems to hold his own ideas about this operation. Some believe in leaving long laterals, but I prefer to have them short, according to the strength. Plenty should be left, as we can pull off but cannot put on. When the pruning is finished we should be ready to start digging and ploughing early in September, or even earlier, and keep on cutting and mowing after every rain, if possible. At the same time we should not neglect to treat the peach trees with bluestone or Bordeaux paste for curl leaf when."

into blossom. Use 1lb. to 10galls. of water. Though up to date we may not have discovered any codlin moth amongst our apples, it is just as well to take precautions. Give them a dose of arsenate of lead should they appear. I only spray twice, commencing when the fruit is well set, and following this up about three weeks later, using 1lb. to 28galls. of water. It is advisable to bandage the trees. After this is done we must take a look over the peach and apricot trees, not merely to put an estimate on the crop, but to pull off a few where there are too many, leaving just that quantity which we think the tree will carry. If the winter and spring have been wet, it may be safe to leave a good crop. On the other hand, it is just as well to leave a light crop if the weather has been dry, as a light crop of good fruit is better than a heavy crop of rubbish, which is very hard to get rid of at any price. Near to harvest time we should look to our van and harness. If any repairs are needed have these attended to. It is also advisable to make arrangements for the marketing of the crop."

Mount Bryan East, March 30.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. J. Thomas, jun. (chair), C. W. Gare, J. Doyle, H. Tralaggan, V. Hughes, F. and R. Thomas, W. Quinn, T. Quinn (Hon. Sec.), and two visitors.

VERMIN.—Attention was drawn by the Chairman to the increase in numbers of both foxes and rabbits in the district. Various methods of destroying the pests were discussed, and it was generally agreed that the foxes could be best got rid of by poisoning.

Port Germein, April 6.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. A. Carmichael (chair), W. Holman, H. Crittenden, J. K. Deer, P. Hillam, Hackett, and E. G. Blessing (acting Hon. Sec.).

MANURIAL TESTS.—Mr. Carmichael had been experimenting with various manures on plots of one acre in extent. Each plot was sown with 1 bush. of Gluyas Early wheat. The land was disc-cultivated to a depth of 3½ in. after the rain in February, and then left. It was subsequently drilled, harrowed, and rolled, and the crop was harvested on the 20th November. The following table sets out the results:—

	Cost of Manure.	Yield.	Value at 3s. 6d. per Bush.	Value of Crop, less cost of Manure.
	s. d.	bush. lbs.	s. d.	s. d.
No. 1. 3cwts. lime, dry slaked	5 0	11 15	39 4	34 4
No. 2. { 28lbs. potash }	4 6	11 0	38 6	34 0
{ 28lbs. mineral super. . }				
No. 3. { 14lbs. potash }	2 3	9 40	33 10	31 6
{ 14lbs. mineral super. . }				
No. 4. No manure	—	9 18	32 6	32 6
No. 5. 56lbs. mineral super. . . .	2 6	12 30	43 9	41 3

The rainfall from seedtime to harvest was 4.50 in. The land on which the experiments were conducted was of a sandy nature, tending to dark loam at the end of the plots.

BARLEY.—The address delivered by Professor Perkins at the Conference of Northern Branches of the Agricultural Bureau, held at Crystal Brook (printed on page 937 of the April issue) was discussed. A number of members had tried barley-growing some years ago, but the crop had not proved very successful in this district.

Port Pirie, April 6.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Welch (chair), T. Johns, F. A. Johns, J. Dick, Hawkins, A. M. Lawrie, Greig, Hector, and Wright (Hon. Sec.).

CARE OF SMALL ITEMS.—The following paper was read by Mr. J. Greig:—"From extensive experience on the land, I have come to the conclusion that there is a considerable waste on almost every farm or station. How frequently do we see a team unyoked in the field, and the harness thrown in front of the team on ploughed ground in fallowing time, when rain may come down at any moment? Were this done only at dinner-time,

it would not be so bad. When there is the slightest likelihood of rain, all harness should be taken inside, not omitting the reins, which one frequently sees left in the paddock from the beginning to the finish of fallowing, or from the beginning to the end of reaping. When afterwards they break under some slight strain, we blame the maker. Swingle-trees are generally left on the ground just as they are, when the team is unhitched, and there they remain to rot or to be attacked by white ants. Bags are another line in which there is much waste. Frequently after seeding-time bags may be seen hanging on or lying under, fences, and examination will show that they are not all super. bags. Even if they were, it is no reason why they should be left in the field. All tools having wooden handles should, whenever possible, be protected from the weather, more particularly the drying effect of our climate and fierce scorching sun. I do not mean to say that all tools, &c., should be housed every night, yet where this can reasonably be done, it is best to do so; but a little forethought should be used as to the most advantageous position in which to leave them, when they have to be left out. Do not leave harness in the paddock. All harness should be kept thoroughly greased. When leaving the plough or cultivator for any length of time, unhook all swings and hang them on to the implement. All bags should be brought in and hung up, either in bundles, or on a loose wire stretched across the barn, in order to prevent mice getting at them. The handles of all tools, when bought, should be thoroughly saturated with castor oil, and then allowed to stand in the sun until the surface is dry, after which apply a mixture of mutton fat and beeswax—three parts mutton fat and one part wax—and rubbed in well to prevent moisture entering the wood, and also to mitigate the drying effect of exposure to weather. The popular idea of young Australia to-day is that all careful management is meanness; and I believe it would be well within the mark to say that there are no people in the world so wasteful and extravagant as the average Australian." Mr. Johns said the majority of farmers were guilty of the negligence referred to by Mr. Greig. Breakages, however, were often due to bad material or workmanship, and not always caused by neglect on the part of the farmer. Harness was another item which was often much neglected. The application of a little neatsfoot oil occasionally would make it last longer, and it would also be better for the horse. As a rule it was necessary to leave harness in the paddocks at mid-day at certain seasons of the year. Collars should not be left lying on the ground even then, as the action of the sun had a drying influence on them which made them hard, and as a result the horses were liable to suffer from sore shoulders. Mr. Johns contended that super. bags, if well shaken, were fit for holding chaff, and he would not hesitate to use them for that purpose. Mr. Hawkins drew attention to an old saying to the effect that "money saved was money earned," and this was especially applicable in the care of the small items on the farm. It was, however, often impossible to get work done, but much would be saved by doing repairs in spare time. He always made it a rule to grease all fork handles, &c., before putting them away at the end of the season. He had found super. bags admirable for blocking up rabbit burrows, and he would only use them for that purpose. The Chairman said there should be a place for everything on the farm, and everything should be kept in its place. Mr. Dick had found that if bags were stacked with the tops alternately reversed, mice would not cause much damage. The middle of the stack of bags should be kept full by doubling a bag occasionally, and the stack should not be placed too near a wall, and it should be heavily weighted.

Redhill, April 16.

Average annual rainfall, 16½ in.)

PRESENT.—Messrs. F. Wheaton (chair), J. McAvaney, Coffee, Hayes, Potts, Steele, Dick, Holmes, Button, F. A. Wheaton (Hon. Sec.), and two visitors.

MANAGEMENT OF FARM HORSES.—The following paper, written conjointly by Messrs. J. J. Hayes and G. A. Button, was read:—"In a farming district such as this, where horses are so essential to the prosperity of the farm, considerable interest should be taken in their welfare to secure the utmost benefit from their toil without injuring their health. The first thing a farmer should do in building up his team is to select the most suitable horse for the work it has to do. The best horse for this district is the Clydesdale. The soil is heavy to work, and you must have weight to shift weight. Care should be taken in the selection of a sire. The farmer should not patronise cheap or convenient sires. The sire the farmer should employ is an upstanding Clydesdale with plenty of bone and muscle and a well-proportioned body. The mare should also be of a similar type. The brood mare, when nearing foaling, should receive every care and attention. We believe in heavily working mares until they are within about two or three weeks of foaling, so that

they have plenty of exercise. This also keeps superfluous flesh down. Mares should be kept in a small paddock, and looked to at least once during the night. It is advisable to have the paddock clear of stable manure, old straw, &c., as such debris often contains germs which are dangerous to mare and foal alike. Do not disturb the mare in the act of foaling. The foal should be watched to see that it sucks properly. As soon as the mare and foal are well, they should be turned out into a well-grassed paddock. Green feed is the best for mares rearing foals. Most mares are worked a little while rearing a foal, which does them no harm as long as it is not overdone. Do not allow the foal to drink while the mare is in a heated condition. Let her cool off first. Three or four hours is long enough to let her carry the milk. If it is carried longer it will be found necessary to milk her. When the foal is six months old it should be weaned. It should be kept in and fed for a few weeks, and have water in the stable so that it is able to drink frequently. Feed on good solid food, such as bran, chaff, and a little corn. Young stock should be kept up in good condition, so as to receive no check. At two and a half years of age they can be broken in and worked lightly at first until they get set. Working horses should be given three feeds of chaff and corn daily, and one of long hay at night. Care should be taken not to put more feed in the manger than can be cleared up before the next meal; as feed left becomes sour and tends to take away the appetite of the animals. Another essential to working horses is plenty of clean water handy to the stable, so that they can have a drink before every meal and during the night. It is advisable to have rock salt for horses when fresh water is used. The horses should be well groomed every morning. The shoulders should be brushed to remove all dry sweat and dirt. The collar should fit the shoulders, and the hames should fit the collar, which should be well brushed before being placed on the horse. Check lining is generally used, but if the farmers tried basil-lined collars they would become more popular, as the basil lasts longer, is easier to clean, and with a little neatfoot oil is kept soft. It keeps the sweat from going into the foundation of the collar. Care should be taken to see that chains are of the same length. Half a link difference in a chain is often the cause of a sore shoulder. The swings should be light and strong. We advocate working the team abreast, as each horse then has his share of the work. Eight hours is sufficient for a horse to work at any time, while six hours is found long enough in the winter season." In the discussion which followed members generally considered that horses were best off when allowed to go to the trough as soon as they came in from work. Mr. Potts said that if young horses while being broken in were washed on the shoulders with wattle water for a few weeks they would not be troubled with sore shoulders.

Whyte-Yarcowie, April 6.

(Average annual rainfall 13½ in.)

PRESENT.—Messrs. Look (chair), E. J. Pearce, Ward, Walsh (two), McLeod, Wittwer, and G. F. Jenkins (Hon. Sec.).

CULTIVATION.—The following paper was read by the Hon. Secretary:—"It must have become apparent to most farmers in the older settled districts of the State that a different system of cultivation is necessary if we are to continue to grow clean crops of grain. The problem of how best to clean dirty land is one that is worthy of attention by any Branch of the Agricultural Bureau. Hence, these few notes are written in order to promote a discussion on the subject. Wild oats are perhaps the greatest pest with which South Australian farmers have to contend, and although they make a very useful fodder when the land is lying out to pasture, or a fair quality chaff when mixed with good wheaten hay, farmers generally would, without doubt, welcome a cheap and efficient way of eradicating them. There are other weeds which, when they get a hold in the land, are even worse, such as sheepweed and charlock (wild mustard), both of which are practically useless in a hay crop and do an immense amount of damage by robbing the wheat plant of the available moisture and plant food. Farmers hold different views as to the most suitable way of keeping the land clean and free from weeds. Some contend that the better way is to burn off the stubble shortly after harvest, and by this means burn much of the seed which has been left on the land. They contend further that the action of the fire on those seeds which are not destroyed makes them germinate much more readily, and by falling in due season after the burn most of the rubbish is destroyed. I must confess, however, that this system does not commend itself to me. It seems to me, first, a waste of fodder which, in a dry winter, is often very useful, and secondly,

by following out this practice every vestige of manure on the surface is destroyed. This practice must impoverish the land quicker than any other system of farming which could be devised, as through the action of the fire, followed by bare fallow, we are burning up all surface manure and not adding any humus to the soil. In my opinion, the three years' rotation—bare fallow, crop, then graze—is preferable. By this system the land, in being turned out to pasture for one year, gets the benefit of all manure dropped by stock, and is in consequence enriched thereby; in addition, all the straw of the preceding crop is left to rot on the land; and although not of a very high manurial value, it certainly helps to give back to the soil some of those constituents of plant food it has taken from it. Again, weeds which grow in the stubbles can be kept from seeding if a flock of sheep is kept; in addition another source of revenue is added, as no animal can be kept which will return such a handsome profit to the farmer for so little labor. As a means of getting the rubbish to grow on the land to be fallowed, I would recommend cultivating the land lightly in the slack time, between harvest and seeding. It will perhaps be unnecessary to go over the land to be fallowed in this way, but I feel sure that the practice will amply repay those who carry it out, even if it is only done on those patches where the weeds are thickest. If it should break up at all lumpy, it will help germination materially if the land so cultivated is run over with the harrows. By means of this shallow surface cultivation, all seeds will be covered and they should germinate with the autumn rains much more readily than if allowed to lie on the surface until turned over by the plough, when many of them will be too deep in the land to grow until worked up with the cultivator to grow with the crop. Some such practice as this will, I feel sure, be necessary if we are to continue to farm successfully in the older districts." In discussing the subject, members stated that the three years' rotation was only practicable on fairly large farms. Where farms were small it would pay to burn off the stubble and cultivate the land in March and harrow it down in order to get the weeds to grow before fallowing. Mr. Pearce said that on much of the stubble land very little feed grew during the first year, and he therefore thought it wise to drill in some fodder plant seed with the wheat. It was his intention to sow lucerne this year.

Yongala Vale, April 6.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. C. Fowler (chair), Miller, Battersby, Jamieson, E. Fowler, Scott, T. and W. Keatley, Schmidt (Hon. Sec.), and two visitors.

PREVENTION OF FIRE.—Mr. Fowler read a paper on this subject, in which he stated that every farmer should provide proper fire-breaks around his property. It was a good plan to plough a break around the crops half a chain wide, after the hay was cut, and to sow these breaks with fodder plants; this would prevent a fire from getting into a ripe crop. Provision should also be made for having a supply of water handy to the sheds and hay stacks. Nearly all the farmers of this district had iron-roofed sheds near the hay stacks, and the water caught up by these roofs should not be wasted, but be stored up in tanks placed in handy positions. These, if raised a few feet above the ground, should provide the necessary pressure to make a hose effective. It would be a good plan if it were made compulsory for all landholders to provide fire-breaks around their holdings. In the discussion which followed members unanimously agreed with the writer's views, and also favored the plan of keeping fire-beaters on their farms.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Angaston, March 30.

(Average annual rainfall, 21½ in.)

PRESENT.—Messrs. Sibley (chair), Friend, Player, Wishart, Dr. Cowan, Ball, Stevens, Plush, Salter, Smith, E. S. Matthews (Hon. Sec.), and five visitors.

THE DELHI DURBAR.—Mr. W. G. Smith gave an interesting address on his impressions of India at the time of the Delhi Durbar, which was much appreciated by members.

Blyth, March 28.

PRESENT.—Messrs. A. L. McEwin (chair), T. Dunstone, C. H. Zweek, Buzacott, Clark, Coleman, J. S. McEwin, T. Roberts, Schuster, Lehmann, Schulze, W. and J. Pratt, Williams, H., W., and W. O. Eime (Hon. Sec.), and six visitors.

LAMB-RAISING FOR EXPORT.—Mr. W. Pratt contributed a paper, in which he stated that the possibilities of the export lamb trade warranted a careful study of the various breeds and crosses. The requirements of the trade should be understood, and the breeder should expend every effort to meet them. The Merino ewe was an excellent type for the breeding of lambs for export. As for the sire, the Dorset Horn was to be recommended. The South Down was a shapely carcass, but was inclined to be rather small. However, when mated with cross-bred ewes it produced ideal freezers from the standpoint of shape and quality of meat. The Shropshire ram was a favorite in this State, but it was coarser than the South Down. All things considered, he would recommend the pure-bred Merino, as under favorable conditions a good lamb would be produced, and if it were not matured in time for exporting the ewe lambs could be kept for breeding, and the wethers would sell readily to the butchers. A fine fleece of wool should also be secured from the ewes. Mr. Williams (visitor) had a high opinion of the progeny resultant from the crossing of Merino ewes with Border Leicester rams, but he thought farmers in this district could not do better than keep to the Merino, with which opinion members generally concurred.

Freeling, March 29.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. F. H. Heinrich (chair), Morris, Neldner, A. Kuhlmann, T. J. Elix, H. Koch, G. A. Block (Hon. Sec.), and seven visitors.

WHEAT PLANT.—The following paper was contributed by Mr. G. H. G. Boerke:—“When travelling through some Oriental countries supposed to have been the home of wheat, nothing strikes the keen observer more than the desolate and barren aspect they present. There we may see the ruins of grand buildings surrounded by deserts destitute of vegetation or animal life. Surely the desert did not exist when the buildings were erected, for who would contemplate building an edifice that would require thousands of men to work for years in a desert? History records that these countries were in a flourishing state, supporting a dense population. What is the cause of this change in the nature of the soil? As all forms of animal life are directly or indirectly dependent on plant life, and the latter depends to a great extent upon the nature of the soil, we may infer that the present sterility of the soil has been produced by the ancients applying methods opposed to natural laws, by omitting to add to the soil those elements that are necessary to support plant life. Consequently, cereals such as wheat ceased to be cultivated in these countries, and were gradually introduced into Europe. Though some authorities look upon the Oriental countries as the home of the wheat, there are others who maintain that the origin of the wheat is in a plant growing along the coast of the Mediterranean Sea. This plant is a grass called *Aegilops ovata*. It is awned, or bearded, and the stalks are very brittle. When subjected to careful cultivation the awns of this grass gradually decrease in size, and finally disappear: the stalks become tougher; the leaves larger, and the grain increases in size. Mr. M. Fabre, who experimented with this grass from 1838 to 1846, obtained a fair sample of wheat, due chiefly to the careful selection of the seed and careful cultivation. Wheat may be classified according to: (1) ‘The appearance of the head’ into unbearded (*Triticum hybernium*) and bearded (*T. aestivum*), as King’s Early, Bearded Gluyas, Indian Runner (a hay wheat). (2) ‘The color of the grain’ into white or red wheat. The red wheat is harder than the white, but inferior in quality, as it yields less flour but it possesses greater productiveness. Red Tuscan and King’s Red are red-grained varieties, while White Tuscan, Yandilla King, Silver King, and Bobs are some of the white kinds. (3) ‘The length of the straw.’ Varieties with long straw, such as Majestic, White Tuscan, and the hay wheats Le Huguenot and Medeah, yield the best crops in dry seasons, while the short straw kinds, as Federation, yield best in a wet season. (4) ‘The rust-resisting properties they possess,’ e.g., Leak’s Rust Proof, Marshall’s No. 3, Ward’s Prolific, and Gluyas; other kinds, such as Federation, King’s Early, Smart’s Early, Dart’s Imperial, and Yandilla King, may be attacked by rust, but they do not seem to suffer much. (5) ‘The flour strength of the grain.’ This is determined by the amount of water a measured quantity of flour will absorb. For example, a bag of Purple Straw

flour will absorb about 45qtrs. or 112½lbs. of water when mixed for baking purposes, while a bag of Jonathan flour will absorb 68qtrs. or 170lbs. of water. The latter kind is therefore considerably better in quality than the former, and should bring a better price in the market. The qualities of wheats are due: (a) To climate. Where the climate is very wet, as in England, the wheat is of a quality different from that which is grown in a dry climate, as that of Australia and the countries around the Mediterranean Sea. Wheat grown in too humid a climate is unsuitable for macaroni. In too hot a climate, as that of the Torrid Zone, no wheat will grow except on elevated regions. Nor will any wheat grow beyond 60° N. or S. latitude. (b) To hybridisation. This operation consists in extracting with a hybridiser the stamens from the head to be hybridised, while the stamens of the required variety are inserted into that head. Experiments have proved that the hybridised wheat when sown will yield as many as seven or more distinct varieties. (c) To selection of seed. By carefully selecting seed wheat at sowing time it is possible so to improve any one variety as to finally, after years of selecting seed, to result in a new variety. (d) To change of locality. A plant that has grown in one particular condition has adjusted itself to its surroundings, but when a plant is taken to other localities it has once more to adjust itself to the new environments, and this process of refitting to the new circumstances may produce new characteristics in the plant. When changing seed, if the object is improvement, observe the following rules:—(1) Change from a cold to a warm climate; (2) from a dry to a wet climate; and (3) from a poor soil to a richer soil. (e) To mode of cultivation. The continual cultivation of one variety of wheat will, after many years, either improve or deteriorate the particular variety as the cultivation has been careful or the opposite. When a grain of wheat is analysed into its constituent parts it is found to consist of water, 14.83 per cent.; gluten, 19.64 per cent.; albumen, .95 per cent.; starch, 45.89 per cent.; gum, 1.52 per cent.; sugar, 1.50 per cent.; oil, 0.87 per cent.; vegetable fibre, 12.34 per cent.; ashes, 2.36 per cent. If the ashes are analysed they are found to consist of potash, 29.97 per cent.; soda, 3.90 per cent.; magnesia, 12.30 per cent.; lime, 3.40 per cent.; phosphoric acid, 46.00 per cent.; sulphuric acid, .33 per cent.; silica, 3.35 per cent.; peroxide of iron, 0.29 per cent.; chloride of sodium, 0.09 per cent. If the wheat straw is analysed it will be found to contain nitrogenous substances, 1.85 per cent.; non-nitrogenous substances, 69.56 per cent.; mineral substances, 4.59 per cent.; water, 24.00 per cent. The ashes of wheat straw consist of potash, 12.14 per cent.; soda, .60 per cent.; magnesia, 2.74 per cent.; lime, 6.23 per cent.; phosphoric acid, 5.45 per cent.; sulphuric acid, 3.88 per cent.; silica, 67.88 per cent.; peroxide of iron, .74 per cent.; chloride of sodium, .22 per cent. The food of the wheat may be arranged under five headings. 1, Carbon; 2, nitrogen; 3, soluble mineral matter; 4, water; 5, air. The original source of the first two is really the atmosphere; of the third and fourth, the soil. But the mineral matter and the water could not alone support plant life. It is absolutely necessary to introduce into the soil some carbon and nitrogen, and this is done to a great extent by the interaction of all manner of plants and low animal life, such as worms, insects, &c., whose remains, combined with the mineral matter and water, make the soil fertile. The farmer can assist nature in reducing the sterility of the soil and increasing the store of food necessary for the wheat plant: 1. By a thorough tillage of the soil to conserve moisture, and in order that there may be free ingress of the air to the soil. The soil robs the air of ammonia, which gas is very valuable to our crops. 2. By introducing into the soil some artificial manures. Stable manure is very good, but it does not return all that a crop takes out of the soil. Even sheep and cattle when depasturing land do not return all that they take out of the land. The land loses those inorganic materials which are necessary to build up all the bones of live stock. Therefore the best manure is bonedust or bone super. An analysis of bones shows that they contain potash, soda, magnesia, lime, carbonic acid, phosphoric acid, and organic matter. Mineral phosphates, which contain chiefly phosphoric acid and lime, are very extensively used in South Australia. These are less expensive than bonedust, and in certain soils have done equally good work. But there are other things to be returned to the soil besides phosphoric acid and lime. If we do not return to the soil all we have borrowed, there will be times when the soil will tell the farmer, 'You have only paid back a part of the materials you borrowed to make bones.' We may think that if we are giving back what is most important it ought to be satisfactory, but we may deceive ourselves. Time will tell whether the soil will become impoverished, and to what extent. 3. By ploughing under weeds and straw. But do not burn the straw, for all burning of plants or straw so as to reduce them to ashes is destructive, and exhausts the fertility of the soil. Remember that by burning straw you lose all the nitrogen and carbon that should go into the soil and keep only the ashes—the dead mineral substance which by itself cannot support plant life. Investigation

proves that the fertility of the soil remains unchanged only in those countries where the soil is of a great depth, and is kept moist through rain or irrigation, or in those which are inhabited by savages who do not interfere with nature. But in a country like ours, with a thin soil and a hot, dry climate, the fertility is reduced more or less speedily by intense cultivation, and the more so by applying methods diametrically opposed to natural laws."

Freeling, April 26.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Neldner (chair), Shanahan, Kuhlmann, H. Mattiske, jun., Elix, C. H. Koch, Harvey, Morris, and G. A. Block (Hon. Sec.).

RAINFALL.—Mr. Aug. Gaertner, of near Freeling, who possesses a rain gauge, handed in the following rainfall table, which was recorded during the period that the wheat was growing:—The rain which brought about the first growth of his wheat fell on May 7th. During this month it rained on six separate days, 151 points being recorded. In June, 254 points of rain fell in seven days; 161 points fell in July in six days; 60 points in August in three days; 200 points in September in nine days; and 45 points in October in four days. The total rainfall recorded was 8 in. 71 points. A better crop was obtained with this rainfall than had been obtained in other years with a heavier rainfall. A great proportion of the land was fallowed, and had also been scarified, so as to conserve the moisture. The crops on the land that were not fallowed suffered from drought. Mr. Gaertner estimated his average yield at 20 bush. of wheat, and two tons of hay, per acre.

Gawler River, March 29.

(Average annual rainfall, 18 in.)

PRESENT.—Messrs. A. J. Bray (chair), J. H. and C. A. Dawkins, C. Dunn, A. J. Davis, C. Leak, Rice, Winckle, Richter, Hayman, F. Bray (Hon. Sec.), and three visitors.

MARKETING PRODUCE AND STOCK.—Mr. H. Dunn read a paper in which he advocated the co-operative factory system in regard to the marketing of butter. It was not advisable, when marketing stock or produce, to place the whole line at once, but to split it. Dairy cows should be sold as springers, and it was most profitable to have them springing during the months of April to July inclusive. The best time to sell pigs was during the winter months, as there was then less risk in connection with curing. They should be marketed alive, and the fact should always be borne in mind that once a pig was fat the cost of keeping it in that condition was heavy. While several members were dissatisfied with the results obtained from sending cream to the factories, generally it was thought that co-operative factories would not be successful owing to the difficulty in securing efficient management. Mr. Winckle believed that dairying was more profitable since the introduction of the factory system than it had been formerly. Members on the whole favored the present system of selling stock by auction. Mr. Davis was strongly opposed to the present system of selling sheep privately at the Adelaide market, and thought every lot should come under the hammer.

Northfield, April 2.

(Average annual rainfall, 19 in.)

PRESENT.—Messrs. Williams (chair), Roeger, Reynolds, N. S. Kelly, Rowe, Wright, and M. C. Mitchell (Hon. Sec.).

THE APPEARANCE OF THE FARM.—The following paper was read by Mr. M. C. Mitchell:—“From close observation in this and other districts of the State, I am led to think that even a brief consideration of this topic will result in much individual and collective benefit. For should thought lead to conviction, as I believe it will, and conviction to action, not only will our holdings be improved in appearance and in market value, but we, in consequence of increased aspiration and consistent planning, will become brighter and happier

men, working under improved conditions, with the added satisfaction of 'Something attempted, something done.' I well remember, many years ago, in the district of Agery, what was once designated by one of our daily papers, 'A model farm.' It was run by two men possessing special qualifications. One kept in touch with the soil, the golden grain, and the clerk of the weather. The other devoted his time to the arrangements of the home yards, to the garden and trees, to the machinery and other mechanical contrivances which his fertile brain had evolved for the purpose of saving time and energy. The passer on the highway noted with pleasure the methodical arrangement and substantial look of the sheds and barns, and took a second look at the green tops of the growing trees, that afforded a welcome contrast to the wide expanse of stubble land. A visitor to the house and yards experienced an increased appreciation of the work, and an added admiration for the management. But, methinks, the best satisfied of all were the owners themselves, who had seen those improvements slowly but surely mature. It may perhaps be contended that no one man, at subdividing and improving a farm, can hope to equal an ideal partnership of two. Still, that is no excuse for the absence of attempt, which in the past has been far too common. Then, to those who have heretofore lagged behind in the spectacular, pleasing, and profitable portion of farm life, my advice is 'start now.' Do not remain stolidly content with present conditions. Profit by the experience of others. Let your well-kept fences, well-hung gates, thoughtfully-planned garden, small orchard, ornamental and shade-giving trees, and tidy premises proclaim the progressive man." In the discussion which followed, members generally agreed with the writer, but thought that to some farmers trees and flowers made no appeal.

Riverton, March 21.

(Average annual rainfall, 20½ in.)

PRESENT.—Messrs. H. A. Davis, J. P. (chair), W. Moss, E. H. R. Scholz, W. B. Davis, A. F. Kemp, J. P. Schultz, R. H. Cooper, J. W. Kelly, F. M. Kelly, J. E. Kelly, Alf. Hannaford, F. Phillips, E. A. Gray, and six visitors.

PREPARATION OF THE SOIL FOR SEEDING.—The following paper was read by Mr. R. H. Cooper:—"The preparation of soil for seeding means the renovation of the land for the growth of corn or other exhaustive crops. This involves the freeing of the land from weeds and the restoration of its fertility by exposure to atmospheric agencies as well as by direct manuring. There are various ways of preparing ground for sowing. In years gone by very little preparation was done; in fact, in all the newly-settled districts and even in some of the very oldest, all that is thought necessary is to plough the land immediately before sowing the seed, scratch it over with what was once a set of harrows, and trust to Providence to do the rest. I understand that in such parts as Pinnaroo, Loxton, and the West Coast they simply burn off the rubbish, drill in the wheat, and look for the crops, and are surprised if they do not get them. But those days and that sort of farming are done with as far as this district is concerned, and the farmer who wishes to reap a bountiful harvest must prepare the soil for the reception of the seed, knowing full well that it is the land that has received the best preparation that is most reliable in good or bad seasons. The preparation of the soil begins the year prior to that in which the grain is sown. It should be ploughed immediately after seeding is over, the depth depending upon the soil. At one time it was thought necessary to plough deeply, but about 3½ in. or 4 in. is quite deep enough for this district. Black ground and limestone can be ploughed in any reasonable weather, but it is not advisable to plough red ground in very wet weather, as it sets down very hard. After allowing the fallow to lie in its rough state for about a month the harrows should be sent over it after a good rain, and the cultivator should be got going in September. Of course, seasons vary, and no set rules can be laid down by anyone as to when implements should be set to work. In some seasons it is only necessary to go over the land with the cultivator once, making the sheep and scarifier harrows do the rest; but there are seasons when, on account of the heavy rains causing the land to become too set to be dealt with by the harrows, the cultivator must be used more frequently. It is always advisable to get the land into a fine state on top, so as to conserve the moisture during the summer months. The light harrows should be brought into use frequently, especially after a rain, thereby loosening the top and preventing evaporation. Should a good rain fall during March it is best

to go over the fallow with the scarifier harrows, so as to kill all the weeds which may have germinated, and thus prevent them from getting too large to deal with during seeding operations. Our greatest enemy at seeding time is the dandelion. Should this be allowed to grow to any size it will be found very difficult to kill, in fact, this is almost impossible in wet weather; and it therefore takes possession, to the almost utter destruction of the young wheat plants. Should the season prove unsuitable for getting the red land fine, the ribbed roller should be put over the rough patches, so as to insure better germination of the weeds before, and the grain at, seeding time. Farmers must use not only their horses and implements but their brains as well; and although most of us have seen poor crops on well-prepared land, owing no doubt to the season, we have all come to realise that to secure a payable crop the land must be prepared for the reception of the seed." Members generally agreed that the use of the rib roller was advisable. Mr. J. P. Schultz had used this implement for the past eight years, and he found that the weeds, &c., germinated quicker than on land which he had not rolled. Mr. J. E. Kelly did not use the rib roller, but used instead a set of three heavy scarifying harrows drawn by eight horses. After he had fallowed the land he ran the heavy scarifying harrows over it. This made it nice to work, and he then kept it stirred up with a lighter set. He would not work red land too fine, as after a heavy rain it set down too tightly. He attributed the fact of his land being so free from stinkwort to the use of the scarifying harrows. Mr. Phillips harrowed some of his fallow with the light harrows and the remainder with the scarifying harrows. He found when he went to work the same land again that the latter worked one horse lighter than the former; more moisture also was retained. Mr. J. W. Kelly had a paddock of fallow, part of it was scarifier harrowed twice and the balance was not harrowed but left lumpy, and he reaped the best crop from the latter. He favored ploughing in the stubble on red land, as it kept the ground more open and would help retain the moisture. He could see to a furrow where he had ploughed the stubble in with a disc plough.

Saddleworth, March 15.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. R. G. Townsend (chair), J. H. and Theo. Eckermann, Graham, Colebatch, Frost, Caskey, Scales, Snell, R. Rex, Crawford, Kelly, Cornwell, and F. Coleman (Hon. Sec.).

CONFERENCE OF NORTHERN BRANCHES.—The Hon. Secretary reported having attended this Conference, and his action in inviting the Branches to meet at Saddleworth next year was unanimously supported and confirmed.

SEEDING OPERATIONS.—In an address on this subject, Mr. Kelly stated that he favored the use of a corrugated iron roller, 8ft. long, weighing about a ton, and made in sections, which enabled it to be turned very easily without scraping up the ground. It left a good seed bed, that allowed the seed to be drilled shallower, and this resulted in a more even germination. For pickling the seed, $\frac{1}{2}$ lb. of bluestone to a bag ($3\frac{1}{2}$ bush.) of wheat should be used, and the pickling should be well ahead of the seeding. Seeding operations should be commenced as soon as the rubbish had started to grow on the fallows, the scarifier being put to work before the rubbish was strong. A scarifier harrow with fine shares was preferable to the ordinary scarifier, which worked too deep for an ideal seed bed. The triangular-shaped implement tended to leave ridges at the sides. Cultivation should be across the way the drill was to be run. He would even favor the buying of extra horses and the hiring of extra labor, if necessary, in order to get the land worked down and harrowed before the drilling was commenced. His practice was to sow $1\frac{1}{2}$ bush. to the acre; if Le Huguenot was to be grown 2 bush. would be needed. A complete manure, such as bonedust and guano super. with nitrogen added was best, and 200lbs. per acre was not too much, considering the feed that would follow the crop, and the extra stock, mainly sheep, that the land would carry. A light harrowing after the drill was always advisable. He made a practice of drilling in about $1\frac{1}{2}$ lbs. to 6 lbs. of lucerne seed with the wheat, according to the number of hoes used. With every other hoe used for lucerne the cost would be 1s. per acre for seed. In the discussion which followed, for hay a mixture of 1 bush. of wheat and $\frac{1}{2}$ bush. of oats was recommended. Mr. J. Eckermann had cut a good crop of hay from a seeding of $1\frac{1}{2}$ bush. of wheat and 1 bush. of oats. The Chairman had had better results from the use of mineral super. alone, than from any other fertiliser.

Salisbury, April 2.

PRESENT.—Messrs. Moss (chair), King, John, E. V. and A. J. Harvey, Heier, McNicol, Tate, Goodall, Bussenschutt, Shepherdson, Ilman, Powell, T. and H. E. Judd, Patterson, Urlwin, Heddle, Baylis, Mueller, and Jenkins (Hon. Sec.).

AUTUMN AGRICULTURAL SHOW.—The following paper was read by Mr. John Harvey :—
 “The exhibits in the grain sections at the Royal Agricultural and Horticultural Society’s Show were disappointing in respect to the number of entries, but the quality was up to the usual standard of South Australian wheats, notwithstanding the unfavorable season. The judges were highly pleased, and considered the entries a credit to the State. A fine entry of grain in the straw, containing 62 different varieties of wheat, gave growers an opportunity of selecting wheats suitable for different districts. In other classes the entries were very few—only one of oats and four or five of barley—but the quality of the exhibit in each case was good. It must be very disappointing to the Agricultural Society, after increasing the value of the prizes and paying freight on the exhibits from the nearest railway station and staging the entries at the show free of cost to the exhibitor, to have so little response from the farmers and wheatgrowers. It shows a want of appreciation of the efforts of the society. The agricultural shows bring the produce of the country prominently before the merchants and visitors, and are of value in this way. In the hay and chaff classes the exhibits were good, and fair competition resulted. Five entries were made in each; but this is too few considering the quantity of hay grown in the State. The exhibits of green fodders were very good. Some of the maize was 14ft. high. The roots and lucerne exhibited were good, but there should have been more entries in these classes. The produce of one farm was a splendid exhibit, and demonstrated what could be grown by an industrious man on the farm. It has been said that a man can produce in South Australia all he requires for his table, and the exhibit demonstrated this to the fullest extent: It included bread (probably made from wheat grown on the farm), bacon, cheese, butter, pickles, fruit of all kinds, green and dried, preserves, jams, vegetables, grain, seeds, and wool, and was really a splendid exhibit. The Government exhibit was a most attractive one. The varieties of grain in the straw and bags, the names and descriptions of the different wheats and their uses, fruits of different kinds, preserved in bottles, dried, in tins; a fine display of apples produced at the model orchard in the hills; products from the Freezing Works at Port Adelaide, such as tinned meats, sheep and lambs’ tongues, manures, &c.; green fodders from the different State farms; wool grown in different localities; photos, &c., all tended to make an attractive and educational display. The machinery provided a most interesting exhibit, consisting of implements of all kinds, from the single-furrow plough to the modern eight or ten furrow. Motors for driving the different machines were largely in evidence. The fruit was splendid, considering the dry season we are experiencing. The apples were up to the usual high standard of quality, and the grapes, consisting of wine and table varieties and currants for drying, were very fine. The vegetables were a credit to the growers and the State. It is questionable whether any of the other States could produce an exhibit of similar quality. The poultry exhibits were good, all breeds being represented by large entries. The value of the poultry industry amounts to several hundred thousand pounds a year, and no farm can be considered complete unless it has a poultry yard. The blood stock consisted of the best we have in the State; and on the whole, from the standpoint of the agriculturist, the show was a great success.”

Stockport, April 1.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. T. Megan (chair), D. G. Stribling, F. Watts, J. Smith, C. Perry, T. Howard, R. Whitelaw, and J. Murray (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.

Weighing Wheat in Bulk.—The proposal that the Government should be asked to institute the system of weighing wheat in bulk was discussed at length. Members did not favor the suggested alteration.

BLUESTONE FOR BLOOD WORMS.—Mr. Perry had treated a mare affected with blood worms for five or six weeks with a dose consisting of a piece of bluestone about the size of a pea, crushed fine and sprinkled on damp bran, and administered twice weekly. The condition of the animal was considerably improved.

YORKE PENINSULA DISTRICT. (TO BUTE.)

Bute, April 2.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. F. W. S. Heinrich, A. Cousin, J. H. Barnes, L. Senior, F. Schedlich, S. Trengove, H. Schroeter, M. Stevens, R. C. Commons, J. Trainor, W. Buchanan, A. Schroeter, M. McCormack, W. J. Mathews, W. H. Sharman, and M. L. McCormack (Hon. Sec.).

FIELD TRIAL.—The Branch decided to conduct a field trial of agricultural implements on August 21st next, and a committee to fix the site and make general arrangements was duly appointed.

Pine Forest, March 5.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. D. Carmen (chair), A. Hewett, S. Barr, A. Nelson, and R. D. Goodridge (Hon. Sec.)

MANURIAL AND SEED TESTS.—Mr. Adam had conducted experiments with the idea of ascertaining the most profitable rate of seeding and the dressing of manure most suitable for the district. On May 31st he drilled in seven one-acre plots with the undermentioned quantities of wheat and manure, which were reaped on the 13th December with the following results :—

Plot No. 1 drilled with	1 bush. seed and	1 cwt. super.	yielded	14 bush. 30lbs.
" No. 2	" 1 bush.	" 1 cwt.	" "	15 bush. 21lbs.
" No. 3	" 1 bush.	" 1 cwt.	" "	15 bush. 34lbs.
" No. 4	" 1 bush.	" 1 cwt.	" "	16 bush. 59lbs.
" No. 5	" 1 bush.	" 1 cwt.	" "	17 bush. 21lbs.
" No. 6	" 1 bush.	" 1 cwt.	" "	16 bush. 24lbs.
" No. 7	" 1 bush.	" 1 cwt.	" "	17 bush. 55lbs.

WESTERN DISTRICT.

Colton, April 20.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. H. Whitehead (chair), A. E. Becker, P. P. Kenny, R. Hull, W. A. Barns, F. Shephard, E. R. DuBois, W. J. McBeath (Hon. Sec.), and one visitor.

BREEDING HORSES FOR FARM WORK.—Mr. F. Shephard contributed a paper in which he stated that as a rule the farmer neglected foals from the time they were weaned until the time came for breaking. It was, however, essential that they should be well fed and cared for at all times. The most suitable time for emasculating was May, which would give the colt time to pick up with the spring feed. The secret of successful breeding was the selecting of well-built, even-tempered mares, which should be mated to sound, reliable sires. The heavily-coated horse was not wanted on the farm, as it would be generally found that this class required more attention. A good fairfi horse was secured by crossing a roadster mare with a draught stallion, the progeny being again bred to the draught horse.

HARROWING.—Members generally were of the opinion that it was advisable to harrow both before and after drilling in crops.

Coorable, March 30.

PRESENT.—Messrs. C. T. Giles (chair), Roberts, Murray, Riddle, Wheadon, Gregory, Bassenett, H. Hobbs, Hobbs, C. B. Atkins (Hon. Sec.), and two visitors.

PHOSPHATIC MANURES.—The paper on "Phosphatic Manures," given by Mr. Fairweather at the Wirrega Branch meeting on February 3rd, and printed on page 867 of the March, 1912, number of the *Journal*, was read by H. V. Hobbs, who continued as follows:—"I have selected this paper as being the views of a farmer who evidently gives more attention to the subject than the majority of farmers. I do not expect that everyone will agree with all the views as expressed, and it may be necessary to modify them to suit the different conditions, such as locality, rainfall, and class of soil. All farmers use superphosphate for wheat-growing, and I doubt if any would attempt to grow wheat without it, although I know that this was done here before the effect of supers. became known. Although we all use superphosphate, I doubt if there is a farmer present who can state what amount of manure per acre it pays best to apply on his land, and back his statement by any definite results in the way of crop returns. The usual application in this district seems to be about 40lbs. to 50lbs. per acre, and although I know many of you have varied the amounts used, yet I have failed so far to find a man who has ruined or even, as far as he knows, damaged his crop by too heavy a dressing of super. The whole trouble seems to be that no one keeps a proper record of his harvest results. It is in this respect that our Branch of the Bureau could do a great amount of good, not only to its members but to the whole district, and thus show practical proof of its worth. Personally, I think that, with the exception of new scrub land, heavier applications will pay; and if we find by actual experiment that an extra 25lbs. or 30lbs. of super. per acre, costing about 1s. 3d., will raise our yield by, say, only 1bush. per acre, then the slight trouble involved will be amply repaid. Seeding time is close at hand, and I appeal to every member to take this question up for the benefit of themselves, the Branch, and the district generally. I would suggest that each member should make at least one experiment this season, take a careful note of all the operations and the results, and hand them in to the Hon. Secretary to be entered up in a book specially kept for the purpose. It could be managed this way:—Take an average sized paddock, say about 100 acres, divide it into two equal parts, both as regards area and quality of soil (as near as one can tell), cultivate and drill the whole paddock in a similar manner, using one variety of seed wheat only, and the same amount per acre, but on one-half of the paddock apply, say, 40lbs. of super. per acre, and on the other half, say, 70lbs. per acre. When stripping, carefully keep the two halves separate, and directly cleaning is finished make a note of the number of bags obtained from each wheat heap. Hand in your result together with remarks on the season and any other conditions that may have had an effect on the crop to the Hon. Secretary. Of course the amounts of super. used per acre may be varied according to each member's particular fancy, and the more the variation the more interesting and instructive will the results be. If we all conduct a simple experiment like this for a few successive seasons we shall eventually be in possession of some very valuable information, which will not only be of direct benefit to ourselves but also to newcomers, our descendants, and the farming community at large."

Elbow Hill, March 30.

PRESENT.—Messrs. Cooper (chair), Dunn, Rehn, Chilman, Jacobs, Freeth, Wheeler, Wake (Hon. Sec.), and one visitor.

LICENSING DAIRIES.—Members expressed the opinion that the regulations under the Food and Drugs Act dealing with the sanitary conditions of dairies should be also enforced in the country districts.

Green Patch, April 1.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. Gore (chair), Merchant, Freeman, McFarlane, P. Sinclair, R. Sinclair, J. Sinclair, and Whillas (Hon. Sec.).

FARMING ON THE WEST COAST.—Mr. Freeman, in a paper on this subject, drew attention to the fact that essential factors in successful farming on the West Coast were proximity to market and careful management of the land. It was a mistake, however, to take up inferior land simply because it was near to the market. Bad farming had been the cause of more failures on the West Coast than anything else. He had been successful in reaping 8bush. to the acre when his neighbors were only securing a return of the seed, and he attributed this to the fact that he sowed on well-worked fallow. He usually had his fallowing finished by August, and after that he continued to harrow and work it down whilst it was moist. The rainfall at Bagster, where his farm was situated, varied from 9in. to 18in.

KALE.—Mr. Freeman had a splendid crop of kale. He had ploughed back 40 acres of fallow last August, and then drilled it half with thousand-headed kale and half with chou moullier, using 1lb. of seed and 60lbs. of super. per acre. The drills were set 14in. apart. He had been grazing 17 horses and cows on it all through the summer, and lately had also put in 110 head of sheep. The kale was 18in. high, strong and healthy, and he considered it a very profitable crop.

Koppio, April 4.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. T. Richardson (chair), R. T. Richardson, H. Thompson, T. Brenhand, C. Barraud, G. and M. Howard, W. Jericho, G. B., T. R., and M. T. Gardner (Hon. Sec.).

EXHIBITS.—Samples of the following fodders grown in this district were exhibited, viz.:—Lucerne, mangolds, kale, paspalum dilatatum, cow peas (with pods), swede turnips, cocksfoot, ribgrass, English prairie grass, seakale, English marshmallow, and chou moullier. Mr. W. Jericho tabled a sample of maize 8ft. in height. This crop had been drilled at the rate of 24lbs. seed and 30lbs. of mineral super. to the acre during October. The alternate hoes of the drill had been shut off.

FODDER CROPS.—Mr. M. Howard contributed a paper, in which he expressed the view that farmers in this district should pay more attention to the growing of root and fodder crops. Lucerne was a most suitable crop, and could be sown at the rate of 6lbs. to the acre through the drill. Sheep's burnett was a good summer feed, and had the advantage that it opened up the soil. Kale, ribgrass, cocksfoot, English prairie and rye grass, as well as all the clovers, could be sown with profit. Mangolds, swede turnips, carrots, and seakale were root crops that warranted the attention of farmers. He recommended sowing the following mixture, which, when grown, should provide feed for rearing and fattening two lambs to the acre, viz.:—Lucerne, 1lb.; sheep's burnett, $\frac{1}{2}$ lb.; kale, $\frac{1}{2}$ lb.; swede turnip, $\frac{1}{2}$ lb.; and carrots, $\frac{1}{2}$ lb.

Miltalie, March 30.

(Average annual rainfall, 14 $\frac{1}{2}$ in.)

PRESENT.—Messrs. J. P. Story (chair), J. W. and E. Story, A. R. S. Ramsey, F. F. Alm, W. G. Smith, E. G. Wilson, and W. E. Hier (Hon. Sec.).

DESTRUCTION OF RABBIT.—Mr. Smith initiated a discussion on this subject. Some members favored the ploughing in of burrows, while others were of the opinion that the spade and fumigator were the most successful methods of getting rid of the pests. Considerable good was done by poisoning. Individual effort on the part of the farmers was practically useless without united action.

SPRING DRAUGHT PLOUGH.—Members were generally of the opinion that the spring draught plough was a great improvement upon the bridle plough, as it not only worked to a more uniform depth but was not so hard on the horses' shoulders.

PLANTING FRUIT TREES.—Mr. Alm said fruit trees should be planted 18ft. apart in holes about 2ft. square in ground that had been well dug. If it were heavy clay, better results would be secured if the holes were dug 3ft. square. Mr. Smith stated that it was better to blow up the ground, and this practice could be followed after the trees had been planted,

Utera Plains, March 30.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. A. Ramsey (chair), A. and C. Venning, W. Gale, W. Stephens, J. and M. Abrook, N. Guidera, F. Braunack, H. T., T. C., and H. G. Hornhardt, H. Hill, G. Barber, M. Hunt, R. Hill (Hon. Sec.), and four visitors.

FIRE RAKE.—Mr. A. Barber read a paper in which he stated that the use of the fire rake was the best means of destroying shoots. Harrows were too close to the ground. Where it was necessary to go over the whole of a paddock, it was advisable to work the rake so that the wind would blow the fire back on to that which had already been burnt, which would prevent the fire creeping along the paddock in strips. If there were many burnt strips in a paddock it would be found necessary to rake a little straw before lighting the fire. Three horses could work a 16ft. rake with ease. An improvement in the implement might be effected by fixing a share on to each tine, which would loosen the ground. It was unwise to break down straw before burning. Members generally agreed that the fire rake was far superior to the harrows for use in connection with stubble-burning.

EMASCUATING COLTS.—Members expressed the view that the emasculator was better than the searing iron for castrating colts.

Yabmana, April 6.

PRESENT.—Messrs. J. N. McCallam (chair), J. F. Robertson, J. Y. Robertson, A. Robertson, J. Penna, F. A. Beinke, G. W. Story, W. W. Lindsay, L. G. Strother, M. K. Frost (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.

Farm Laborers' Blocks.—It was thought that the erection of cottages by the farmers to provide accommodation for laborers was a scheme more to be recommended than the suggestion that small blocks should be surveyed in new hundreds for holdings for farm laborers.

SUMMER GREEN FEED.—Mr. J. G. Robertson read a paper, in the course of which he expressed the view that considerable profit should result from the cultivation of sorghum in this district. Fairly regular summer rains were experienced, and these should be taken advantage of. One acre properly prepared and sown with this fodder should produce about 10 tons of excellent feed for young horses and milking cows. He had successfully grown sorghum during the summer just closed. Mr. W. W. Lindsay thought that, on account of its rapid growth, sorghum was a suitable summer crop, but Mr. J. Penna did not think it would be successful in a dry climate. The Chairman had been growing this crop, but before putting it on the fallow he would like to know its effect on the following wheat crop. Mr. Robertson thought the wheat yield would not be affected.

WHEAT AND FRUIT-GROWING.—Mr. W. W. Lindsay, in a paper, stated that as wheat-growing was so unreliable, it was advisable to combine with it some other means of profit, and for this district fruit-growing was to be recommended. To properly work land for wheat-growing would cost from 30s. to 40s. per acre, including seed, super., and carting, and with a 20bush. harvest, and wheat at 3s. 4d. per bushel, the return would be equal to £3 10s. per acre. If five acres were planted with fruit the cost of the trees would amount to £50. The preparation of the ground, ploughing, and cultivating for one year would cost from 20s. to 30s. per acre, the whole outlay for the first year amounting to, say, £56. Until the orchard bore fruit, £7 10s. per annum should be sufficient for upkeep. When in full bearing, the trees should return about 15s. each, which was equal to £75 per acre. Members generally were of the opinion that it would pay the farmer to have an orchard, but it was thought that five acres was rather more than he could look after.

Yadnarie, March 30.

PRESENT.—Messrs. A. Jericho (chair), J. H. and E. Kruger, C. and F. Dreckow, A. Spriggs, R. B. Doet, R. Parbes, C. B. Schubert, J. J. Deer (Hon. Sec.), and four visitors.

IMPROVING THE MEETINGS OF THE BUREAU.—The following paper was read by the Hon. Secretary:—“The country Branches of the Agricultural Bureau are for the purpose

of disseminating among agriculturists practical information on farm problems, and it should be the endeavor of each member to make the meetings a thorough success. In our efforts to obtain information regarding better methods of agriculture we are not only learning of that from which we derive our living, but are helping to extend Australia's greatest industry. The Branches of the Bureau are responsible for much of the success attending the scientific methods of farming adopted at the present time. If we are going to get good practical results from our meetings it is necessary that we should carry them out on absolute business lines. A member who writes a paper should give his subject careful thought; not put the matter off until the night previous to the meeting and then write the first thing that crosses his mind. When submitting a subject give your practical opinion. Do not advocate that in which you do not believe just for the purpose of promoting discussion, because the paper will be printed in the *Journal*, and you may induce the readers to adopt methods in which you yourself do not believe. When a subject is before the meeting for discussion, each member should express his opinion. Any member who has read a paper for discussion should not speak again on that subject unless it is to give an explanation. In my opinion, the Chairman should not only keep the subject before the meeting, but should also keep members to the subject under consideration, and he should call to order any person speaking without addressing the chair. In my opinion, minutes should be read and adopted at the close of the meeting. This will give members an opportunity to suggest any alteration they think necessary before the report is sent on to the Department. Homestead meetings should be held as often as possible. At these meetings we should endeavor to obtain practical knowledge, and not devote the time to recreation. Meetings should be made as attractive as possible, on some occasions taking the form of a social. This will induce visitors to attend. Combined meetings of two or three of the Branches should be held, say, once a year. For instance, this Branch might arrange a meeting with the Yabmana Branch, and by this means keep in touch with other Branches in our district as much as possible." In discussing the subject, members agreed that more homestead meetings could be held with advantage.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, March 29.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. G. E. Venning (chair), Bone, R. F. Venning, and A. H. Fidge (Hon. Sec.).

RING-NECK PARROTS.—Mr. G. E. Venning read a paper in which he drew attention to the fact that a great deal of damage was being done to wheat and fruit crops in the Southern districts by the ring-neck parrots. He had tried various means of keeping them out of crops, but had met with little success. Members were unaware of any satisfactory method of destroying the birds.

Monarto South, March 1.

PRESENT.—Messrs. A. P. Braendler (chair), A. Patterson, R. E. Andus, Geo. Patterson, E. Tilbrook, B. Hoff, C. F. Altmann, R. Hartmann, H. Frahn, C. F. Thiele, and C. Hill (Hon. Sec.).

POULTRY FOR THE FARM.—Mr. C. Hill read a paper on this subject, in which he said that there were many breeds of fowls from which to choose, but he preferred the White Leghorn because of its capacity as an egg-layer. It was advisable to buy the best strain,

as this generally proved the cheapest in the end. From a pen of say six hens, at least 300 chicks should be obtained. This number should provide a very good start. At the age of about 12 weeks the cockerels should be separated from the pullets. If fed well they should be ready for the market in four months, while in five months the pullets should begin to lay. If at the age of six and a half months some of the birds were not laying, it was advisable for the owner to then sell them for table purposes. A good stock of pullets should bring in, on an average, from 5s. to 8s. 6d. per annum. A good yard of hens, say 300 to 600, should average 200 eggs each. If the hens were bred so that they would start laying in March, the average price of the eggs should be about 10d. per dozen, which made a total income of about 15s. per hen. To feed a bird from the egg to the age of six months, and then sell for 1s. 6d., was a mistake, for he had found that the average cost of feed for that period was about 4s. From the age of six months to the age of 18 months the cost of feed was, to the private fancier, about 8s. 6d., while to the farmer the cost was only about 6s. This scale of profits has been based on the average hen. During the winter months a mixture of bran and pollard greatly enhanced the egg yield. Boiled rabbit was another good winter egg-producer, and one of which the birds were fond. No food should be given to chicks for the first 36 or 40 hours. The first feed should be fine sand and then well-toasted breadcrumbs. With the exception of finely-chaffed green grass, their diet should for the first week be dry feed, *i.e.*, breadcrumbs for the first three days, after which a little sifted oatmeal could be added, followed by cracked wheat. Plenty of fine grit and charcoal should be available to them at all times. At the age of a fortnight a little mash could be added to the diet, after which the food should be modified to that which the older birds received. Careful weeding out when young ensured healthy poultry. A little permanganate of potash in the water tins should prevent disease. The opinion of the writer was that poultry was one of the best side-lines which the farmer could undertake.

SELECTION OF SEED.—The following paper was read by Mr. A. Patterson:—"The selection of seed is a very important matter. It is just as necessary for the farmer to have good, pure, clean wheat for seed as it is for the stockowner to breed from the very best he can get. No stockowner would think of breeding from inferior animals, and no farmer should sow inferior grain. He may get a good crop from poor seed, but probably if the seed had been better he would have had a much better crop. As a rule farmers do not take enough care in the selection and grading of seed wheat. The average farmer only runs his seed through the winnower once or twice, but all wheat for seed should be graded, so as to remove all small and cracked grain and other rubbish, such as drake, sheepweed, &c. No doubt all farmers present have observed small heads in their crops, about 6in. or 10in. shorter than the average crop. If you examine the grain in these heads you will find that though it may be well shaped, it is much smaller than the grain in the large heads. It therefore naturally follows that if you sow small grain you must expect to reap small grain. The farmer should know by experience what particular varieties of wheat are most suitable for his land. Farms for the growing of seed wheat and other grain should be established in every district. Most farmers would not object to giving a good price for good pure seed, and it will not be very long before we have these wheat-breeding farms. All seed, before sowing, should be carefully pickled as a precaution against smut. I have always found bluestone very effective. It does not follow that if you sow good seed you will always get good crops. There may be a drought, or red rust, hot winds, storms, &c., may cause injury to the crops; but I am convinced that if you make a judicious selection of seed, combined with good cultivation, it will go a long way towards good returns. The quantity of seed to be sown to the acre varies. Early sown crops do not require so much seed, except for hay, as later sown crops. From $\frac{1}{2}$ bush. to 1 bush. is required for the former, and 1 bush. to $1\frac{1}{2}$ bush. for the latter in this district."

Monarto South. April 2.

PRESENT.—Messrs. A. P. Braendler (chair), P. B. Frahn, H. Frahn, R. Hartmann, E. Hartmann, G. A. Hartmann, H. A. Hein, and C. Hill (Hon. Sec.).

THE CARE OF HORSES.—The following paper was read by Mr. H. A. Hein:—"In a country such as South Australia, where horses play such an important part on the farm, it is necessary that the utmost care should be bestowed upon the animals, otherwise owners cannot expect to utilise their services to the fullest extent and secure the

highest return for the money spent upon their purchase. The most important point connected with the care of a horse is the food and water. A horse should be fed well when working. A mixture of chaff and oats is the best feed during the day, but during the night I give them as much hay as they can eat. It is a mistake to throw feed in the manger, and not trouble to clean it up. A horse should have his drink before feeding, because he will then feed much better. A good warm stable, with plenty of ventilation, is essential. A horse should not be worked too hard until he is about five years old, or one is likely to stunt the growth of the animal. A farmer should breed his own horses. The best mares only should be kept for breeding, and no more foals should be bred than can be properly fed. The best horse for farm work is a thick low-built animal. He will stand the travelling well, and will not eat as much feed as a big horse. An important consideration in working a horse is to see that he does not suffer from sore shoulders. Each horse should have a well-fitting collar, as badly-fitting collars are often the cause of sore shoulders. A simple but good remedy for this trouble is as follows:—In a tin of hot water dissolve some lard, and then add powdered blacklead and sulphur. When nearly cold, add carbolic oil. If the horse is at all touchy, it may be wise to rub the mixture on the collar where it touches the sore. Care must be taken that the collar is cleaned every day."

Moorlands, April 10.

PRESENT.—MESSRS. L. Spurr (chair), Oppatt, Neumann, A. and H. Miatke, R. Spurr Bauer, and Fead (Hon. Sec.).

WHEAT-GROWING.—MR. H. Miatke delivered an interesting address, in the course of which he stated that from 60lbs. to 90lbs. of wheat was not too heavy a seeding for this district if it was intended to cut the crop for hay, and if grain were required, 45lbs. to the acre would be ample. At least 70lbs. of super. per acre should be drilled in with the wheat. After clearing and burning new land it would be found advantageous to plough it, and fallow it during the second year. February was the most suitable time for cutting shoots on stubble land. It was best to roll scrub in August. If this was done earlier it would perhaps happen that the mallee would get wet, with the result that sand would adhere to it, and a good burn would be difficult to obtain. Generally it would be found that better results attended the use of the stripper and winnower than the complete harvester. Too much wheat was lost on the rough land, and too much rubbish was collected by the harvester. While members agreed with Mr. Miatke's remarks generally as to the quantity of seed to sow, it was thought advisable that it should be increased somewhat with the late sowings. On rich soil 60lbs. of super. per acre was sufficient, but the light sandy soil required 90lbs. Where the stubble was thick enough to burn without the shoots being cut, it was advisable to do this, as it would be found that more stumps were destroyed.

DEPARTURE OF HON. SECRETARY.—MR. C. S. Fead, who had held the position of Hon. Secretary to the Branch since its inception, tendered his resignation owing to his leaving the district. Members regretted that it was necessary for him to sever his connection with the Branch, and expressed their appreciation of the work he had done in the interests of the Bureau.

Parilla Well, April 18.

PRESENT.—MESSRS. J. Johnston (chair), W. Johnston, F. Foreman, D. Ferguson, W. Austin, H. Austin, A. E. Leak, L. G. Neville (Hon. Sec.), and five visitors.

WET AND DRY SOWING WHEAT.—In discussing this subject, members considered that as a general rule dry sowing gave the better results. Owing to the large areas cropped, unless the rain fell early, it was impossible to put off the sowing awaiting the fall. Last year early and dry sown wheat yielded from 11 bush. to 16 bush. to the acre, whereas the late and wet sown crops only yielded from 5 bush. to 10 bush.

Parrakie, April 20.

PRESENT.—MESSRS. F. J. Dayman (chair), F. S. Dayman, C. E. Hammond, T. Lewis, W. Throldgold, O. and C. Heinzel, R. F. Brinkley, J. Tomby, M. F. Lee, A. Dayman, F. W. Gravestocks, A. J. Bealitz, A. C. Hameister, H. Diener (Hon. Sec.), and two visitors.

IMPORT DUTY ON SUPERPHOSPHATES.—The suggestion that an import duty of 10s. per ton be imposed on superphosphate was discussed at length. Members unanimously supported a resolution condemning the proposal.

PICKLING WHEAT.—A lengthy discussion took place with regard to the advisableness of pickling seed as a preventive against smut. Some of the members were prepared to sow wheat unpickled provided it had been grown from seed pickled the previous year. Mr. Beelitz, who always pickled his seed before sowing, found that bluestone was more effective in preventing smut, but it tended to retard the germination to a greater extent than was the case with fungusine.

Wilkawatt, March 30.

PRESENT.—Messrs. D. F. Bowman (chair), W. J. Bowman, T. Sorrell, sen., J. W. Altus, C. and T. Sorrell, F. Speckman, W. R. Neville, F. W. Altus, P. Gregurke, W. J. Tylor (Hon. Sec.), and five visitors.

DEPTH OF PLANTING SEED.—A lengthy discussion as to the most suitable depth to which to drill in seed resulted in the majority of members agreeing that drilling 2in. deep resulted in the best germination.

FAT LAMBS AND WHEAT.—The following paper was read by Mr. W. J. Bowman :—
 “My object in writing this paper is to offer suggestions that may prove beneficial to the small farmer, more especially the wheat farmer. The time has come when farmers in this district should turn their attention to sources of income other than wheat-growing. Wheat is too subject to the vagaries of the weather for the farmer to depend on it alone. As many now have their holdings well cleared and fenced, a system of mixed farming should be adopted. This would minimise the risk of failure should the season prove unsuitable for wheat production. Some may fancy dairying, but as it is not in my line I am not recommending it. My object is to suggest the growing of fat lambs for export purposes in conjunction with wheat-growing. The direct financial return is not the only benefit the farmer will derive, although this cannot be overlooked. No doubt sheep on a farm are valuable in more ways than this. They will benefit the land by enriching it and by keeping down weeds and noxious plants, turning them into profit as fodder for their own support. They will also keep the fallow clean, where it may not be convenient for you to do so otherwise, thus saving the horses and wear and tear of implements. Their travelling over the land will help to keep the surface loose, and this will conserve moisture. Farmers will also be growing their own meat. In the first place it is necessary to sheep-proof fence and subdivide into paddocks to suit individual circumstances such an extent of your farm as you can afford year by year. Then you must carefully consider its carrying capacity—not for a good season or a bad one, but a normal one—so as to avoid overstocking. A sufficiency of feed is essential for both wool and lamb raising. For a ewe to throw a strong lamb it must be well fed. Such conditions will produce a robust lamb, which will keep growing right away from its birth. I do not recommend keeping sheep on the farm for wool-growing alone, as fat lambs pay better, as there are two returns from the ewe, i.e., wool and lambs. The Merino ewes are more easily procured than others. They return a better fleece and a greater price per pound than the wool from crossbreeds, and being hardier they will live on less feed. Choose robust and large-framed ewes carrying a profitable fleece. Buy these young, say four-tooth, but do not ignore a full-mouthed ewe. Merinos will be less troublesome in connection with the fences. I do not hold with the farmer breeding his own ewes, for to do this necessitates saving 25 per cent. of his ewe lambs each year; therefore, say out of a flock of 100 ewes, he would have this number less lambs to sell. Early maturity is one of the chief objects, therefore the Merino ram is unsuitable. There are about six breeds of British rams to choose from for this purpose, i.e., the Shropshire, Dorset Horn, Lincoln, Leicester, South Down, and Romney Marsh. Of these the most fancied is the Shropshire, as it has been well tested and has proved a valuable early lamb getter, twins being not uncommon. It pays to buy a pure-bred ram, as it will throw a better lamb than a grade ram. Always bear in mind, if you are going into the business on business lines it is just as well to start from a good standard. Buyers always remember the growers of good lambs. It is a well-known fact that a pure-bred ram will get more uniform stock than a grade ram; in short, he transmits his good qualities to his progeny, while the grade ram may transmit his faults. With lambs sold when they leave the mothers, say between

the ages of four and five months, the amount and quality of the wool may affect the selling value of the skin to the extent of say 3d. or 6d., whereas it is very easy to affect the meat value to the extent of 1s. per lamb. Therefore, when selecting a ram select one that will enhance the meat value rather than the wool, as it is an established fact that rams carrying good fleeces have not produced such good lambs as those carrying short fleeces. Choose rather a meat-producer than a wool-grower. The rams should be put with the ewes about the middle of November and not later than 1st of December. Allow one ram to 50 ewes. I do not favor using lambs younger than two-tooth. Allow the rams to stay with the ewes for eight weeks. The gestation period of a ewe is 21 weeks. If the rams are removed at the end of January the ewes will begin to drop lambs at the end of April and early in May. You should have the lambs off your hands by November. Should the rams, in the course of two days, not begin serving the ewes, a good plan is to yard them up at night with the ewes. Tailing and castration should be done as soon as the lambs are strong enough to stand the operations, but not after they are more than five weeks old. I would not allow the lambs to become much older, as they are apt to receive a check in growth, and the breeder who is going in for the fat lamb trade must avoid this. When tailing, see that the knife is sharp and clean, and is kept so. A keen edge is absolutely necessary to avoid any jar when cutting off the tail. After the operation the lambs should not be dropped down roughly on the ground, but put down carefully on to their legs. Avoid putting them into a dirty yard after tailing. A good plan to keep them quiet is to turn a few ewes into the yard where you intend putting your lambs as you tail them. Do not keep them yarded longer than necessary. If these points are carefully attended to you will be little troubled with blood-poisoning or tetanus. When your ewes commence lambing see that they are kept quiet and give them all the attention you can in case any ewe may need assistance. With a flock of, say, 100 ewes you should have at least 90 lambs, and it is quite possible to have 100. The lambs when sold should return 10s. per head net, and the ewes, say, 7s. worth of wool; so a small flock will bring you in a nice sum yearly, besides assisting in keeping the land clean."

SOUTH AND HILLS DISTRICT.

Cherry Gardens, April 2.

(Average annual rainfall, 35-3in.)

PRESENT.—Messrs. S. W. Chapman (chair), T. Jacobs, sen., J. Mildwater, J. Lewis; J. Tozer, C. Lewis, C. Ricks, E. Broadbent, A. Jacobs, H. Jacobs, A. R. Stone, Tom Jacobs, jun., and S. H. Curnow (Hon. Sec.).

EXHIBITS.—The Hon. Secretary tabled samples of King David apples, also specimens of Cleopatra, picked for export in the middle of February. They were in perfect condition. Mr. Chapman tabled samples of apples consisting of Rome Beauties, London Pippins, and Dunns, affected with the disease known as "crinkle." To most of the members the disease was quite new until this season. Mr. Chapman mentioned that he found that London Pippins were the most badly affected. Mr. Curnow said the trouble seemed wide spread this year, and in some of the orchards near Blackwood the Rome Beauties were most seriously affected, considerably more than 50 per cent. of the crop being ruined. The disease did not always seriously affect the health of the fruit. One side would be perfectly normal, and the diseased side would seem to shrink and collapse, the skin showing small crinkles, or waves. The flesh immediately beneath the shrunken part would show a thin layer of brown or bruised tissue. Members could form no idea as to the cause,

Mr. C. Lewis had noticed a slight touch of the disease last year, the tree was unhealthy and dying back. It was agreed that the trouble was prevalent on apparently perfectly healthy trees, and even on quite young ones.

POISONING RABBITS.—Mr. Mildwater intended to make an attempt to destroy rabbits with poisoned apples. He mentioned that his neighbor had strewn many portions of apples around in badly affected parts, and the next morning an examination showed that the rabbits had devoured every slice. It was his neighbor's intention to follow this up by spreading slices sprinkled with powdered strychnine, as he had proved this mode to be most successful. Mr. T. Jacobs considered the laying of poisoned apple most dangerous to stock, and mentioned that only a short time ago he had seen a rabbit pick up a whole pear and run off with it. If a rabbit carried the poisoned bait away in a similar manner, a very small portion would kill it, and the rest of the bait would remain as a serious menace to cows and other stock, and also to useful native birds, &c. Mr. Curnow favored the use of apple or apricot green sticks. If the strychnine was dissolved in a small quantity of vinegar, then thoroughly sweetened with sugar and mixed with flour paste, and painted on the sticks, it proved a very safe bait. The rabbits would soon bark the sticks, after which the latter would be comparatively harmless. Mr. H. Jacobs had splendid results from the use of toxa, and gisko. He had poisoned hundreds with the contents of a 7-lb. tin. Mr. T. Jacobs, sen., was satisfied that shooting was the most satisfactory means of riddance.

THE FRUIT CROP.—The President reported on the serious wind storm of March 8th. The storm had blown down hundreds of cases of fruit.

ORNITHOLOGY.—Mr. Jacobs said every one interested in soil tillage or the grazing of stock should at once make himself familiar with the birds and insects which were his friends, and with those that were otherwise. With regard to the birds, he thought that we had few enemies. The Lorikeet family and the grass parrots were of little use, and he did not know why the latter was protected, but around here they were nearly extinct. The Finch family contained both friends and foes; the native species were harmless, but the introduced species, such as the sparrow and goldfinch, were troublesome to the fruitgrowers and others. The goldfinch did much damage to the grapes and strawberries. One of our native birds, the silver-eye, did considerable damage; but on the other hand it did an enormous amount of good in devouring myriads of aphides, &c. The starling was undoubtedly a pest, but it also had its redeeming features. It was a splendid insect destroyer, and in parts of the North had been known to destroy plagues of caterpillars. Only during the fruit season was it a pest. During nesting-time the starling killed countless insects for feeding its young. The jackass and magpie were useful birds, but the smaller birds devoured many more harmful insects. The jackass and magpie would kill these smaller insectivorous birds. The Keet family destroyed no insect life, but were honey gatherers, or seeders. Mr. Ricks found that the sparrow and goldfinch did good work in devouring the seeds of stinkwort, Scotch thistles, &c. They also killed the cabbage blight, especially where the larger leaves had been removed from the plants. Mr. Curnow was in absolute sympathy with the Bird Protection Act. He did not like to think of any of the birds becoming totally extinct. Every year it became a more serious problem with our native birds as to where they were to nest and find fresh feeding grounds. The tens of thousands of acres of land that were being denuded of timber, meant the deprivation of homes of countless little scrub birds. These birds were, of necessity, driven into the more timbered regions, and we in the hills should do our utmost to see that they were not molested. No one knew the great value that birds were to the producer.

POMATORILINUS SUPERCILIOSUS AND POMATORILINUS TEMPERALUS.—The following paper was read by the Hon. Secretary:—" *Pomatorilinus superciliosus* is known almost everywhere as the cat-bird. It is gregarious in its habits, and is usually found in families of up to a dozen. It is a welcome and valued friend to the man on the land, for it is a most energetic insect hunter, and nothing is more pleasing than to watch a family at work searching for food. With its wings slightly spread, and chattering incessantly, it gets over the ground in a series of hops, diligently in search of insect life. The bird is a poor flier, and when disturbed, flies to some low tree or shrub, and reaches the higher branches by springing from bough to bough. It should be encouraged as much as possible to take up its abode in the orchards, &c. *Pomatorilinus temperatus* is a first cousin, and is found in Victoria. Some time ago it was voted, through a newspaper plebiscite, to be the most

valued insectivorous bird in that State, and is known there as the codlin moth bird. The *pomatorhinus* have a habit of building several nests before finally settling down to house-keeping. Four eggs form a clutch."

Hartley, March 30.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), Clark, Brook, Stanton, Hudd, Pratt, Hill Phillips, and Bermingham (Hon. Sec.).

FALLOWING.—Mr. S. Pratt read a paper in which he said that fallowing should be commenced not later than the first or second week in July. If left later there was the danger of dry winds evaporating the moisture from the soil and leaving it too dry to allow of the working being continued. It should be ploughed as deep as possible without turning up the clay. It would generally be found that two horses were required for each furrow of the plough. It was unwise to lessen the depth of ploughing simply because there was insufficient strength available. More horses should be procured. Good shares should be used, and it was better to plough in lands than around the paddock. A fairly wide headland should be left, so that the horses would not tread down the ploughed ground when turning. Harrowing should be close to the ploughing, and in the same direction. Weeds would germinate better when the ground was harrowed fine. The cultivator could then be put on, and kept on whilst the weeds continued to grow.

Ironbank, March 29.

PRESENT.—Messrs. C. Morgan (chair), R. E. and C. Coate, Geo. Pole, W. Coate (Hon. Sec.), and five visitors.

BROWN CRACK IN APPLES.—The following paper was read by Mr. Leo. Coate :—" Some growers are of the opinion that Dunn's Seedling is not a profitable apple to grow, owing to its susceptibility to brown cracks, which are mostly to be found in the vicinity of the stem. It would be better to try to remedy this disease rather than to allow an apple possessing such good dessert, cooking, and exporting qualities to be discarded in favor of apples which up to the present have not realised such good prices in foreign markets. When trying to remedy a defect we all know that the most essential point to be discovered is the cause. In the first place it will be noticed that the apples mostly affected are those that are grown in flat, dark soil, which has a tendency to be boggy in winter and exceedingly dry in summer time. Trees growing in land composed mostly of quartz gravel, and land with a hard clay subsoil are also affected. With trees growing on hilly land, composed of brown slate gravel and chocolate-colored soil with a good drainage, in most cases the fruit matures free from cracks and good fruit usually may be found on healthy young wood or young trees. We cannot do other than attribute the trouble to improper treatment of the tree. No application of spray is beneficial while the fruit is on the trees: It would possibly be better to apply suitable manures at various times of the year, the effects of which would be felt when the tree was in bloom and right on until the fruit was well formed. Seeing that the disease up to the present time has received little attention from growers or pomologists, it remains with us all to do our best by experimenting to check it. Possibly we will find it to be closely related to the disease known as ' bitter pit,' which is so troublesome with many other kinds of apples. We see that Dunn's Seedling, Five Crown or Dumelow Seedling, and Cleopatra may grow within 20ft. of one another in a flat piece of ground, the Cleopatra and Five Crown or Dumelow Seedling, will be affected with bitter pit while the Dunn's Seedling will be badly cracked, but will have no bitter pit. This, to my mind, is due to the construction of the fruit, the disease finding easier paths to the surface in some fruits, and is in itself a proof that cracks are merely ' bitter pit ' showing in a different form."

Kanmantoo, March 30.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. J. Downing (chair), W. Shepherd, J. Shepherd, R. Tallot, E. Shepherd, H. Prym, R. Critchley, S. Critchley, R. Downing, A. Mills, W. and I. Wooley, and W. Mills (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—After considerable discussion it was decided that the Branch should support the proposal to introduce the system of selling cattle by live weight.

LAMBING EWES.—The following paper was read by Mr. J. Shepherd:—"Ewes that are expected to lamb should be carefully scutched at least a fortnight before lambing. Do not knock them about by trying to do too many. From 200 to 300 is enough for two men to do carefully in one day. Cut away all pieces of wool and locks that are hanging about the udder and teats, because many lambs are lost through sucking a piece of wool instead of the teat. Examine the ewes to see if any of them have had teats damaged by being cut at shearing time. If you find any, mark them. Some ewes will rear their lamb on the one teat, but often the teat that is blind will become sore by rubbing against the sheep's leg, and so cause great pain, and the ewe will refuse to let the lamb suck. A good plan is to rub the teat and side of the udder with a strong solution of alum, which will harden the skin and dry up the milk. At shearing time cull out the ewes so treated. The ewes should not be interfered with, as they generally do best when left alone. They should not, whilst lambing, be rounded up or driven about. Go carefully around the camps to see if any ewes get cast or down in lambing and are not able to rise. If you find a sheep that has already lambed down and unable to rise, do not lift her up at once, but turn her over on the opposite side, and place the lamb, which may possibly be found running about with the other sheep, close to her nose. She will soon commence to clean it. Then put the lamb to the teats and endeavor to induce it to suck by squirting some warm milk from the ewe's teats into the lamb's mouth. When it has had a drink, place the lamb a few yards in front of the ewe, and raise her up; if she stands all right, let her go, but if likely to fall, walk her about and rub her legs in order to get the stiffness out of them. It is a good plan to let the sheep lean against a fence or a tree. A ewe that has been down requires constant watching for any sign of it having been blown by flies. If you see a sheep twitching and stamping its feet you may be sure that there is something wrong. If you discover one ewe badly blown, try to place her right away from the other ewes; because if left with them it is very probable that more will be affected. Do not change your ewes from one paddock to another whilst they are lambing, unless it is to a paddock well known to the sheep, as they will remain with their lambs much better in the paddock to which they are accustomed. When the lambing is finished tail the lambs as early as possible, and feed them liberally." In discussing the subject, Mr. A. Mills said it was a good plan to hold the hind legs of the ewe when scutching, as they could not, when in that position, strain so much. When a ewe had twins it was advisable to take one away, unless they were in a very good paddock. Dry ewes should not be left with lambing ewes, as they travelled about too much and caused the others to leave their lambs. A ewe could be made to adopt a strange lamb by rubbing the skin of the dead lamb over the skin of the live one, or by skinning the dead one and tying the skin over the live lamb. Mr. Shepherd considered the knife better than the iron for tailing, as the iron often burnt the bone and caused a sore to form. The younger the lambs were tailed the better. The knife should be cleaned in a strong solution of carbonate of soda before being used.

Kingscote, April 1.

(Average annual rainfall, 18½ in.)

PRESENT.—Messrs. P. T. Bell (chair), J. Wright, F. Wood, A. Anderson, R. J. Cook, M. J. Chirgwin, J. Couling, J. Turner, D. C. Mundy, W. A. Strawbridge, A. Neave, B. H. Bell, and four visitors.

IRISH BLIGHT.—In view of the fact that Kangaroo Island was declared free from Irish blight, it was decided that a meeting should be called to consider the advisableness of requesting the Government to prohibit the importation of potatoes to the Island.

Longwood, March 30.

(Average annual rainfall, 37 in.)

PRESENT.—Messrs. W. H. Hughes (chairman), J. and W. Nicholls, J. C. Blakely, H. Vogt, G. W. Doley, J. Roebuck, E. J. Quinn, J. R. Coles (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. J. Nicholls. The orchard was inspected, and members noticed that where a strong solution of bluestone spray had been applied to trees the leaves had fallen and the apples were much brighter than those on trees which still retained their leaves. So far as this district was concerned the Rome Beauty was adjudged to be a most superior variety. Both Winter Permain and Adams Permain were prolific yielders of good flavored fruit, but it was generally conceded that the former was the better. The vigorous nature of the Wellington, or Dumelow Seedling, was evidenced in a case where a single graft had been put into the lower fork of a tree of another variety and had grown out strongly and produced a heavy crop of fruit, although the balance of the tree had not yet carried fruit.

Lyndoch, March 28.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), H. Klaubie, J. Mitchell, A. Kennedy, H. Schrader, H. Springbett, P. Burge, W. H. Lawes, J. S. Hammat (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION—

Weighing Wheat in Bulk.—The proposed substitution of the system of weighing wheat in bulk for that at present in vogue was discussed. Members decided to support the change, and suggested that the chief difficulty likely to be encountered was in connection with the adjustment of the weighbridges.

MacGillivray, March 5.

PRESENT.—Messrs. R. Wheaton (chair), H. Ayris, A. Burfitt, J. Matthews, H. E. Petras[†] H. J. Wiadrowski, H. C. Williams (Hon. Sec.), and two visitors.

FRUIT CULTURE.—Mr. H. Petras read a paper in which he stated that Kangaroo Island was capable of producing excellent fruit. When selecting a site for an orchard it was necessary that care should be taken to secure ground well above the high-water mark. This should be cleared of all stumps and other obstructions likely to interfere with cultivation. Care and attention were potent factors in fruit-growing, especially during the first summer after planting. Manure should not be applied to the roots, and pruning should be practised. The trees should be planted well apart, and if thought desirable, a crop of roots could be grown between the trees when they were still young. Export varieties of apples and pears should be planted. In discussing the paper it was mentioned that fruit trees should not be planted in wet ground, but the varieties most likely to survive under such conditions were quinces and pears. Mr. Ayris had not met with success in his attempts to grow almonds. Members agreed that the best aspect for an orchard was a site that combined good drainage, with shelter from prevailing winds. The Hon. Secretary suggested that it was desirable when selecting trees to secure those grown in the hills.

MacGillivray, March 26.

PRESENT.—Messrs. R. Wheaton (chair), H. Ayris, H. E. Petras, A. J. Nicholls, H. J. Wiadrowski, A. Stirling, H. C. Williams (Hon. Sec.), and one visitor.

SEEDING.—The following paper was contributed by the Chairman :—“Of all work on the farm, seeding is the most important, for the success or failure of the farmer will depend largely on how the land is prepared and whether the seed is sown at the right time. This paper will refer chiefly to the requirements of our own district, and before dealing with the sowing of the main crops I wish to mention that I consider a crop for green feed should

be the first sowing on every farm. For this purpose ground off which hay was cut last year, or a small paddock that is nearly grassed, does very well. This ground should be broken up with the plough or cultivator as soon as the first rains have fallen, or before, if it is of a sandy nature, and sown with Cape barley. When sheep are kept another piece could be sown with rape, barley, grasses, or oats. These crops will grow faster than the natural grasses and give good feed when most needed, but to be a success they must be planted early. Should heavy rains fall after February no time should be lost in getting the seed in. For the main crops at least half should be on fallow, and the other half on new or stubble ground. There is not enough fallowing done in our district. If in the wheat districts on the mainland the crops were put in in the same way as is often done here, the returns would not be any better than those from the poorest soils of our district. We should fallow well and sow the same ground with oats or barley the following year. Last year on my farm fallow gave 30bush. of wheat to the acre, and the ground ploughed just before seeding 14bush. Both were sown together. Farmers often have oil or gum to attend to when they should be preparing the ground for sowing time, and they neglect the land at the most critical time, with the result that the crop is put in late. I would urge the necessity of having ploughs and other implements in good order and the seed well cleaned, or better still, graded, so that when the first rains come a start can be made immediately. Fallow should be well cultivated before sowing, or if it is very dirty, a shallow ploughing may be a better way of cleaning it. New and stubble land should be ploughed to a depth of from 2in. to 3in., and should either be cultivated or harrowed to make it fit for drilling. With new ground there is not the danger of a dirty crop, but the stubble should be cultivated before drilling. Avoid sowing wheat two years in succession on the same ground, or sowing wheat after oats or barley. If wheat is grown, put it on fallow or new ground. The best time for sowing will depend on the season. May and June are the best months, although good crops of barley have been grown on good ground when put in later than this. The ground should be clean and sown as soon as one thinks it is fit, but it is better to sow a little later than risk having a dirty crop. Until last year the seasons have been wet, and should they continue as dry as last year no doubt the best crops will be those sown on clean ground and put in in good time. When sowing ground that is to be left out during the following year it is advisable to sow 1lb. of lucerne seed mixed in with the super. The first crop to be sown is the oats, and part of this, being cut for hay, should be on a good piece of fallow. The balance of the oats could be sown on the stubble. If sowing any poor, sandy, or wet ground, oats should be grown. I do not pickle oats, and sow from 1½bush. to 2bush. to the acre. Over here we do not experience trouble through the ground not being sufficiently wet for sowing. If the ground is clean, oats can be sown when the ground is dry without danger. Cape and Algerian are the only two varieties I have grown. Wheat is the next, and should be sown when the ground is damp, so that it commences to grow at once. The stirring of damp ground also makes a firm seed-bed, which is essential for a successful wheat crop. For pickling I use 1½ per cent. to 2 per cent. solution of bluestone, putting the grain out on the floor and turning it with a shovel. The quantity of seed sown to the acre will depend on the soil. With poor soils 40lbs. is sufficient, while on good soil 1bush. is not too much. I have had best results from Combination and Federation varieties, and last year Walkers did well, but any medium to early variety is suited to the district. The medium varieties should be sown first and the early varieties later. Every farmer should sow a plot of Cape barley yearly, as it will generally yield well and is good feed for any kind of stock. Of the malting varieties Prior barley seems to be the general favorite. A 13-disc. drill, with the discs 7in. apart, is a good size for stumpy ground, and it should be set to sow as shallow as possible. The ground requires to be harrowed after drilling; although harrowing takes time, it pays to do this after the drill, as it leaves a better surface and covers all the seed. There are various patents attached to drills for covering the seed, but I have not seen any at work. The manures most suitable is a matter of opinion, but it should be dry and free running, so that one can be sure of an even distribution; 1cwt. of 38 per cent. to 38 per cent. to the acre is about the amount required, and in buying manure secure the cheapest manure per unit, all other conditions being equal. To sum up, prepare the ground as early and as well as possible, then sow the grain as soon as you think the ground in fit condition to receive it. Whilst agreeing that the practice of bare fallowing was desirable, some members thought that it was not advisable to treat heavy and light soils alike. Mr. Ayris ploughed his paddock early instead of bare fallowing. To prevent leaching on light soils, a cover crop of legumes might be tried on fallow. Several members had secured satisfactory results from rye. Mr. Nicholls said rye grain, when crushed, made excellent horse feed. If sown for green feed, it was necessary to feed it off when young, otherwise it became too coarse.

Morphett Vale, March 19.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. A. C. Pocock (chairman), L. F. Christie, H. O'Sullivan, H. V. Sprigg, T. Anderson, F. Rosenberg, A. Connole, W. Goldsmith, A. Anderson, T. Higgins, E. E. Hunt (Hon. Sec.)

HORSE-BREEDING SOCIETY.—A committee, consisting of Messrs. Pocock, Christie, O'Sullivan, and E. Hunt, was appointed for the purpose of going further into the matter of the formation of a horse-breeding society, and securing nominations for membership.

Morphett Vale, April 23.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. A. C. Pocock (chair), Rosenberg, O'Sullivan, Christie, Gilbertson, Goldsmith, T. Anderson, Higgins, Perry, Sprigg, Connole, Hunt (Hon. Sec.), and one visitor.

CALF SCOURING.—Mr. Connole stated that a calf which he had been feeding on new milk, on having its diet changed to a mixture of 1qrt. of molasses, 1qrt. of milk, and 1qrt. of water, soured very badly and died within two and a half days of the first feed of the altered ration.

STABLE MANURE.—Mr. A. Connole read a paper in which he stated that straw from the bottoms of stacks, and debris of a like nature, should be heaped and allowed to rot. This would make a valuable dressing for fallow. It was preferable to spread such manure on the ground rather than to plough it in, as if the latter course were adopted a firm seed bed would not be secured, especially in the case of limestone land. Further, a covering of manure on the land formed a mulch, and so assisted in retaining the moisture in the soil.

Mount Barker, April 25.

PRESENT.—Messrs. H. N. Bell (chair), L. Hughes, F. Follett, Geo. Cleggett, J. Morris, Jas. Cleggett, J. Choat, J. B. Paech, B. Stephenson, R. H. Grimes, P. Stephenson, J. Brinkley, W. Pearson, Dr. Scott, A. D. Wilkinson, J. G. Thomas, S. J. Bishop, F. Trelevan, D. Monfries, H. Trelevan, C. Crompton, D. N. Wollaston, A. Fergusson, P. Davis, B. Fuller, J. F., R. F., and C. Liebelt, B. Fidler, J. E. Smith, Bert Pope, A. P. Herbertson, F. Simper, J. Little, H. Jones, A. B. Blades, Joe Pope, W. Salman, E. Schmidille, J. A. E., and L. A. Cornish, Fred. Virgo (Hon. Sec.), and 10 visitors.

EXHIBIT.—Mr. Monfries tabled an exhibit of Up-to-Date potatoes taken from one root, grown under irrigation, which weighed 8lbs. The crop was planted early in November, 1911, and the manure, 2cwts. of bonedust, was used, after which a crop of peas was turned in, and then another 2cwts. of potato manure added when the potatoes were planted.

DAIRYING.—Mr. P. H. Suter (Government Dairy Expert) gave an interesting illustrated lecture on dairying, which was followed by a good discussion.

Mount Pleasant, April 12.

(Average annual rainfall, 27 in.)

PRESENT.—Messrs. H. A. Giles (chair), P. Miller, T. C. Phillis, W. Roesler, C. O. Royal, J. T. Miller, G. A. Vigar, D. C. Maxwell (Hon. Sec.).

DESTRUCTION OF RABBITS.—The following paper was read by the Hon. Secretary:—
“The subject that we have in hand this afternoon is one of vital importance to the majority of farmers and station owners throughout the whole of Australia. I am quite safe in saying that the loss occasioned by rabbits in Australia amounts to several millions of

pounds annually. This damage and loss goes on year after year without any sign of abatement. We hear a good deal of the value of the rabbit export industry, of the labor employed in connection therewith; but this sinks into insignificance when we compare it with the losses occasioned by the rabbit. There is the actual loss of crops and grass; the erection, interest on, and upkeep of thousands of miles of netting fences; the cost of poisoning and trapping, digging out burrows, &c.; and occasionally great losses from bush fires caused by phosphorus; and also the loss of a good number of valuable stock through getting the poison and eating poisoned rabbits, as well as the destruction of multitudes of useful birds. Another point that is perhaps not very often counted on is that the rabbits we have make it possible for foxes to live and increase to an alarming extent, occasioning the loss of very many lambs and much poultry. Seeing that so much loss is caused by the rabbits, the wonder is that more is not being done to exterminate them. It is not my intention to deal with outside country, such as the Far North, or the newly-opened up country, but it is our own district, and similar country, to which I will refer; country that is capable of carrying anything between a sheep to two acres and two sheep to one acre. In this district we have very little scrubby country to contend with. The harbors of the rabbits are rocks, creeks, and sand banks or sand flats; and there are two ways of dealing with rabbits in these places—in a right way and a wrong way. The wrong way is to put in a considerable amount of work once a year or so, but to leave enough rabbits to stock the place again for the next year. The right way, according to my idea, is to clear out every rabbit, if possible, so that no seed is left for next year, or any other year. 'But,' you say, 'how can this be done?' Well, the first thing is to commence destroying them about the middle of January, when they have left off breeding and most of the small ones are grown, and keep on destroying until they are all exterminated. It is useless one farmer going on with it while his neighbor does nothing; but everyone should kill at the same time. 'But, then, everyone will not do so,' you say! Why won't they? It is partly because they do not consider the matter seriously enough. Some authorities will tell you that eight rabbits will eat as much feed as one sheep; others say 10 to one; others again, 12 to one. I cannot say how many will do so, but I know that the rabbits eat the choicest of the feed, and sheep will not fatten where rabbits are numerous. If we consider, then, that 10 rabbits will eat as much as one sheep, would we leave even 10 alive on our property? If we go about it the right way, it does not take a man long to kill 10 rabbits. The simultaneous destruction of rabbits in a district should rest, first, with the landholders of the district, and if they are too lax, then it should rest with some higher power. That higher power should be the district council. As a rule the members of our district councils are sensible, level-headed men, who understand pretty well how the affairs of the district should be managed. I have not had an opportunity of studying the Vermin Act thoroughly, but I do not think the same Act should apply to all districts alike. For instance, in a district like our own, where it is quite possible to have the rabbits exterminated, I think an inspector should be employed who would see that all rabbits were cleared. Those landholders who neglected to carry out the work should have it done for them, and be charged for it, and in addition, fined. I do not favor the method of imposing a small fine on a landholder for neglecting to clear the rabbits on his property, and doing nothing more, as in many cases he would be quite willing to pay the fine rather than destroy the rabbits. In districts where there is a large quantity of unoccupied land, or scrubby, poor country, it is quite impossible to get rid of them entirely; therefore an Act of a different nature should apply to these districts. I am not in favor of using poison of any kind (except in places where the rabbits are very numerous) for two or three reasons. First, there is the danger of phosphorus starting bush fires. Then there is the risk of stock getting the poisoned baits, or eating the poisoned rabbits. Again, where poison is used it is very often the case that those who use it do very little else to follow it up, with the result that rabbits are left to stock the land again. The plan I favor is to dig out all burrows which do not go too deep, and block up all rocks, leaving one or two holes at each bunch of rocks at which to set wire netting traps; have two or three good rabbiting dogs and a gun, so as to catch or shoot any rabbits which are not in the holes or rocks, and if enough men are put on it will not be long before all the rabbits are destroyed. In some cases it is advisable to have a line of wire netting to stop the rabbits, because, when you commence hunting them, they move on to the next paddock; and when they are hunted there they will come back again; but it is absurd to wire net small paddocks just on account of rabbits. There is gross mismanagement, either amongst the farmers themselves, or in the Rabbit Destruction Act, when anyone has to net in even an ordinary sized farm. The method I have adopted is to take a piece of wire netting about 3ft. by 4ft. by 1½in. gauge; make it into a round cage, closing up one end and leaving the other end open. It is now about 4ft. long by nearly

1ft. in diameter. About a foot from the open end I put in a trapdoor, also of wire netting, fastened to a piece of No. 4 wire bent into a circle, and made a little smaller than the cage so that it will work smoothly. Hang the door to the upper side of the cage by small pieces of wire, put a couple of wires just outside of the door to prevent the rabbits getting out, and the trap is complete. One man should be able to manipulate from 10 to 20 of these traps satisfactorily, according to the kind of country he has to work on. If the country is rocky, take the traps, a spade, a pick, and a sledgehammer about 10lbs. or 12lbs. weight. If any burrows are outside of the rocks, dig them as near as possible to the rocks, and break stones into the hole. It is very seldom that rabbits will get out past stones if they are broken fairly fine, neither will they go in from the outside. Set a trap at the most convenient hole, blocking up every other, and the rabbits will come into the trap. The advantage of the wire-netting traps over the ordinary spring traps is that when the rabbits are in the hole they are unable to get away. Sometimes it is necessary to leave the trap a considerable time at one hole, as the rabbits will not try to get out, especially if they are old and cunning. Small rabbits generally come out during the first night, but older ones sometimes stay in for several days, especially if there are a number in the warren. If sandy country has to be dealt with, or banks of creeks where the burrows go very deep, I dig each hole until it is fully 3ft. in depth, set a trap at the most likely looking hole, and fill in all the others with sand; and by this method I am sure of getting all rabbits out of the hole. Some advocate just filling in the burrows with sand, but I have proved that in the majority of cases this is not satisfactory, as in some cases the rabbits get out, and the hole apparently is still closed. As the loss caused by rabbits is so immense, we should each do all in our power to have them exterminated. We should remember that we need not expect to be able to sit down and watch the rabbits clear out themselves, but that this requires a lot of work and good management as well; but it is work that, I am sure, will pay handsomely for the doing." In discussing the subject, Mr. Miller said he had been very successful in destroying rabbits in the North by using sandalwood leaves poisoned with arsenic. Other members recommended the filling in of all holes but one, and into this placing cotton waste dipped in bisulphide of carbon, after which the hole should be blocked, making the burrow airtight. Great difficulty had been experienced in dealing with the rabbits in rocks, and the plan recommended by the writer of the paper was thought a good one. It was resolved that, in the opinion of this Branch, the attention of district councils should be called to the necessity of enforcing the provisions of the Vermin Act, and it be a recommendation that they employ inspectors resident outside their respective districts for three months of the year to enforce the simultaneous destruction of rabbits.

SOUTH-EAST DISTRICT.

Keith, March 29.

PRESENT.—Messrs. Marcom (chair), Makin, Hutchings, Leishman, Williams, Fulwood, Pearson, Dall, Schultz, Shannon, and Lock (Hon. Sec.).

ANNUAL MEETING.—The Hon. Secretary presented his annual report, in which he stated that during the year 10 meetings had been held, with an average attendance of nine members. The following subjects had been dealt with:—"Lucerne Growing," "Preparation for Seeding," "Farmyard Manure," "Pig Raising," "Mallee Farming," "Harvester v. Stripper," "Cows and Poultry," and miscellaneous subjects appertaining to agricultural pursuits.

Kybybolite, March 28.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), G. H. Hahn, C. Hahn, F. C. Lacey, A. Bradley, jun., E. W. Duffield, H. M. Koth, and C. A. Scholz (Hon. Sec.).

PICKLING SEED WHEAT.—The following paper was read by Mr. Lacey:—"When I began to pickle wheat a few years ago, I used $\frac{1}{2}$ lb. of bluestone to every four-bushel bag. I found that although, perhaps, the pickle was of the right strength for the first few bags, by the time I had finished the seeding it was two or three times too strong, as I dipped the wheat into a cask and left it to drain well. I see by a report of the Clarendon Branch, printed in the February *Journal of Agriculture*, that members advised pickling with $\frac{1}{2}$ lb. of bluestone to the bag. Where the bags or half-bags are dipped, if you put $\frac{1}{2}$ lb. of bluestone in the pickle for every bag and pour in just the amount of water that the bag will absorb, the pickle will get stronger. I have found that a one per cent. pickle—that is 1 lb. bluestone to 10 galls. of water—is too strong, unless there is smut in the wheat; and my advice to all is not to sow wheat that has smut in it. Pickling has been proved to seriously affect the germination of the seed, and the stronger the pickle the more grains will be affected, therefore, use a weak solution of pickle. Better still, sow part of your crop with good clean unpickled seed that grew from seed pickled last year. I sowed between 40 acres and 50 acres last year unpickled, and the crop averaged two bags per acre more than the crop alongside which was pickled with a one per cent. solution of bluestone, and it was practically free from smut. It is my intention to further experiment this year in the same direction. Care must be taken to see that there is no smut in the seed. If we can produce two or even one bag per acre more from unpickled wheat, the risk is well worth taking with a portion of the crop, at any rate."

Millicent, March 5.(Average annual rainfall, 28 $\frac{1}{2}$ in.)

PRESENT.—Messrs. G. Mutton (chair), H. F. L. Holzgreffe, G. Serle, H. Oberlander, H. Hart, and H. Day (Hon. Sec.).

GRASSES.—Mr. H. Hart initiated a discussion on this subject. He contended that rye grass would practically destroy all Scotch thistles. Thistles thrived best in overstocked and scantily grassed country. It was the opinion of Mr. Holzgreffe that there was not nearly enough grass seed sown in this district. The outlay would ensure a handsome return.

VEGETABLE SEEDS.—In a discussion on this subject, Mr. Mutton said that he found it almost impossible to obtain reliable swede turnip seeds. Mr. Holzgreffe also had noticed this, and suggested that if seeds were grown in the district they might become acclimatised, and prove more reliable.

POTATO GRUBS.—Mr. Hart explained, in answer to a question, that the potato moth laid her eggs on the surface of the potato; the grubs hatched and bored through the tuber. He advised keeping seed potatoes on netting in the shade of trees.

RABBITS.—Mr. Hart strongly recommended heaping a quantity of loose dry sand over rabbit burrows, and adding to the supply as they dug it away from the inside. This, of course, was only possible in sandy country.

Millicent, April 9.(Average annual rainfall, 28 $\frac{1}{2}$ in.)

PRESENT.—Messrs. H. F. L. Holzgreffe, J. J. Mullins, J. Bowering, H. Oberlander, G. Serle, T. Edgecumbe, and H. Day (Hon. Sec.).

GRASS CULTIVATION.—The address given by Mr. Colebatch at the Conference of the South-Eastern Branches and printed on page 950 of the April issue, was discussed at length. Mr. Holzgreffe said the sowing of grass seed was a very important matter. There was not enough done in this direction. The New Zealand and colonial rye grasses were perennials. He had tried Poverty Bay, but was disappointed with this variety, as it did not

stand for any length of time. It was necessary, when going to the expense of sowing, to sow a variety that would stand. He would sow half a bushel of Cape barley with the grass seed, of which enough should be sown to ensure a decent crop. Sowing should be on well-harrowed stubble land. His experience had been that rye grass did not impoverish the land as some people thought it did. Indeed, his wheat crops had proved more satisfactory in paddocks previously under rye grass. Where the headlands of one paddock had been sown with white prairie grass, the result was very noticeable in the wheat crop which followed. He regarded rye grass as the king of all grasses. There was nothing to equal it. It should be heavily stocked and prevented from seeding the first year. Mr. Edgecumbe had secured a heavy growth of feed from Italian rye grass the first year, but it did not stand. It was wasting seed to simply sow on scarified land. It required ploughing to enable the roots to secure a firm hold. He had sown 44 bush. of seed on 33 acres of ground with good results. He intended sowing a paddock with rape next year. Mr. Mullins mentioned that Messrs. Williams Bros. (Millicent) had land which had been under rye grass for a number of years. They treated it annually with lowt. of super. He believed it would pay to drill in phosphates on land under permanent pasture. Mr. Bowering was of the opinion that Californian lucern (*melilotus*) was one of the best of fodders, but was very likely to over-run the paddocks. Generally speaking, the hay crops in this district were cut too late, and the *melilotus* in the crops was past its prime. Members viewed a little of this fodder in the hay as an advantage. The Hon. Secretary believed in Yorkshire fog for sandy soil. The characteristics of several clovers were discussed. The one known locally as "trefoil," was an annual, and seeded freely, growing best on a soil containing lime. Red clover was a biennial. The stone clover thrived well on stony hills, and Mr. Serle stated that the bur clover also adapted itself to that class of country. It was a good feed, but its seed was well known to woolgrowers as being troublesome. Strawberry clover required a damp situation, and was recognised as a valuable fattener. The white clover, which had died out in many localities, was seen at its best in titree land. The value of lucerne was emphasized, and it was stated that this crop should be allowed to lie for a while after cutting before feeding to cows, to obviate the risk of bloat.

CAPONISING POULTRY.—Mr. Serle explained the benefits of caponising, and showed three birds recently operated upon. They soon recovered from it, and then rapidly increased in weight, and were in every way superior for table purposes.

Mount Gambier, March 9.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Wedd (chair), Watson, Botterill, Dow, Engelbrecht, Keegan, Schlegel, Major, Buck, F. and J. Holloway, Kilsby, G. and D. Collins (Hon. Sec.).

FODDERS AND GRASSES.—Mr. Colebatch, M.R.C.V.S., B.Sc. (Agric.), contributed a short paper in which he stated that on volcanic land Cape barley, sown as early as the season would permit after the end of February, and at the rate of 1½ bush. to 2 bush. per acre, should give satisfactory results. The addition of 2 lbs. or 3 lbs. of rape or half a pound of kale or French cabbage (*chou moulrier*) would improve the quality of the green feed. Rape alone should furnish good early feed, but it was more likely to succumb if the early rains were not followed by occasional showers during the first stages of growth. If the season opened early, mixtures of oats and peas, or oats and vetches, could generally be relied on, and on the good land it would be a good practice to sow a portion of the green feed area to some mixture of legume and cereal, as the food was much more nutritious than the cereal alone, and the land was benefited through the symbiotic bacteria in the root nodules of the pod-producing plant. There were many other plants that were worthy of a trial in small areas, notably crimson clover, or trifolium, and berseem, or Alexandrian clover. The frosts in this district might prove too severe for these two clovers, more particularly the Berseem, but they certainly merited a fair trial. For late feeding, oats by themselves, or an admixture with peas or vetches, should do well; and if it were desired to let the land lie out for a season nothing was more likely to suit the district than Italian rye grass, sown at the rate of 1½ bush. to 1½ bush. per acre. On the lighter lands rye alone, or rye and peas should give the best results, but he recommended a trial of rape, rape and mustard, and white turnips. For the earliest sowings reliance should be placed on the rye. Later on, when there was less likelihood of protracted spells of dry weather, the others might be given a trial. The question of fertilisers could scarcely be answered in

general terms, though the principle held good that the land must contain abundance of available plant food if a rapid growth of feed was to be secured. It depended on the condition of the land at the time of sowing. Much of the volcanic land would fail to respond to manures, whereas the lighter soils would never carry a good growth of early green feed without their aid. Generally speaking, phosphatic manures would be required. Superphosphate (bone or mineral) at from 1cwt. to 2cwts. per acre would be a good, serviceable dressing; and on the lighter land it might be necessary to add some nitrogenous fertiliser, such as blood manure or nitrate of soda, after the crop had braided. The paper was followed by an interesting discussion on the merits of various fodders. The Hon. Secretary had found Algerian oats, sown with the first rains, gave an abundance of feed all through the winter. It was of little use to sow this crop late, as when the ground became cold the oats perished. If sowing with the first rains were not accomplished, Cape barley, rye, and white mustard made a splendid mixed crop. The rye came away quickly and protected the barley from the winds. Rye grass had done well with him on heavy land. He ploughed stubble very lightly for this grass. He had drilled in the seed after getting the land worked to a fine tilth. If the soil were properly worked a supply of green fodder could be secured throughout the year. Some of his neighbors were now cutting 90-day maize. Oats would follow, then Cape barley, mustard, and rye and mangolds. Mr. J. Botterill considered that Cape barley would yield twice as much feed as oats in a given time. After being eaten down oats did not recover as speedily as the Cape barley. He thought it impossible to have a supply of green fodder all the year round in this district unless maize were grown. Rye grass he had found to be a failure on rich land. Rape had also been a disappointing crop with him. Mr. J. A. Engelbrecht said his experience was that if one had good grass land he would get better results by feeding his stock on the natural grasses than on barley, oats, vetches, and other crops. If farmers saved their paddocks for three months and let them get a good start he ventured to say they would get more feed from the natural grasses than from the cultivated paddocks. The cows also gave a better percentage of milk from the natural than from the cultivated grasses. One seldom heard of English barley being put in late for green fodder, but a paddock had been put in at about July on the property he now held, just prior to his coming into possession of it. Cattle ate it bare till November, when he shut it up till Christmas. It was then over 5ft. high. Mr. Buck had found chou moulrier very subject to frost here, but strange to say at Naracoorte frost did not harm it. Barley was better than oats for dairying. It must not be overstocked, and if sown late it would run a big risk of serious damage from frost. Mangolds should be pulled at least a week before being fed to stock. Mr. G. H. Kilsby said the greenfeed to be cultivated must be governed by the class of soil to be sown. Oats had done well with him on light sandy soil; also barley, oats, and mustard, mixed with 70lbs. of super. per acre. This last crop gave splendid feed. On the heavier soil of Moorak, Cape barley did well, and white mustard could also be sown on that class of soil if dairying was not carried on. Rye grass did best on heavy soil. Mr. Holloway had found the best fodder for sheep was a mixture of mustard and rape. He had a paddock that had been under rye grass for the past 10 or 12 years. He would not sow grass seed very early for fear it should be killed by hot weather. He preferred to wait for the rains to come and then plough in the seed. The Chairman thought one reason why more rape was not grown in the district was that it did not come to perfection here. The aphid often killed it, or the frosts cut it down. But barley, rye, mustard, and oats, he thought, would always be a success if they were put in early. The Secretary had tried Dwarf Essex rape for several years, but with no success. He sowed it in September, and by Christmas the aphid had destroyed it. He tried it in winter also, but it was not successful. Then he tried it in the autumn, but the winter was too cold for it, and it failed through the frosts. It wanted a soil that was near the water or had a good clay subsoil.

Mount Gambler, April 13.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Wedd (chair), Watson, Smith, Pritchard, Sassanowsky, Innes, Holloway, and Collins (Hon. Sec.).

HANDLING YOUNG HORSES.—The following paper was read by Mr. J. F. Holloway:—“This article is written more particularly as applicable to local conditions, where the farmer only breeds limited numbers of horses, usually for his own use. The horses bred may be divided into two sections—light and heavy. The necessity for this division arises

from the fact that the two types receive, as a general rule, different treatment as foals, as the heavy mares are usually used for work on the farm, whereas the light mares with foals at foot are, generally speaking, turned out away from the stables. Let us consider the draught sorts first. As foals, these are for the most part fairly quiet, through being fed along with the mares. Then, when the mares are harnessed, the foals are either left in the loose-box, or are tied up with halters. This latter is an excellent plan, followed by many up-to-date farmers, as the foals never forget that they have been held and tied up. After having been turned out for some months, as soon as the rope is put on to them again they will prove amenable to reason, if they have been through the tying-up process as foals. Further, when it comes to breaking them in to harness, this early lesson will come to the assistance of the breaker. I have always favored the tying-up method for both light and heavy sorts. But now, when we come to consider the lighter types, we are faced with the difficulty of not having the foals about us so much, these being, as previously mentioned, turned out away from the stables. As light mares with foals at foot are of little or no use for work, this proves, generally speaking, the most advantageous and economical method. However, at about this season of the year we find it a good plan to wean the foals. I say this season advisedly, because there is no fixed time, and it is useless to take the foals from the mares until there is an abundance of green feed for them, as, fortunately for this district, there is at present. To wean the foals we bring them in with the mares, and secure them, preferably in a loose-box, taking the mares away to a paddock distant enough to prevent their being heard. This also gives us the opportunity of catching and handling the little steeds, and, as a rule, they are easily tamed if taken quietly. If this plan were more generally followed it is safe to predict that far less trouble would be experienced when they were old enough for work. If a greenstuff paddock and plenty of chaff and good water are available that will be about the extent of their requirements until the spring, when they may be turned away to forage for themselves until they are 2½ years old. After this it is advisable to get them in harness or saddle, or both, as required. I am quite aware that, by keeping the youngsters on good grass, with free access to the chaff-box from the time they are foals, they will do better. But few farmers would think of making provision for keeping half a dozen foals and an equal number of yearlings and two-year-olds about a stable. Besides, I fail to see that it would be an economical procedure to do so where breeding is carried on to the extent of, say, half a dozen or more each season. With draughts, of course, the high prices that have ruled of recent years really warrants more in the way of feed; and even where the grass is good I would always favor the assistance of the chaff-box, especially through the winter. The age at which those of the heavy type may be broken varies according to the size and condition of the animal; but the farmer should be guided by circumstances also. However, I favor the age of 2½ years with these, as with the light sorts, and for the same reason. The winter will then be just coming along, and by giving the colts a little work, and good attention with regard to feed, by the time the spring of their third year comes they are in good condition to be put to constant work if required; or may with advantage be turned out to enjoy the good feed during the spring for a couple of months before being settled to their tasks. *Method of Breaking in.*—The method I have always followed is that of mouthing with an ordinary bridle and bit, using a leather roller to which to fasten the reins. This must not be girthed up tightly, but held from coming forward by using the crupper. The reins should not be fastened up so tightly as to cause a sore mouth, as is too often the case. I use a leather head stall without a bit, as well as the ordinary bridle, and give the colt all his first lessons in guiding by driving with plough reins fastened to the sides of the head gear, and not on to the bit. After the young beast has become used to the reins about its legs, and will guide reasonably well, it may be let go for a few hours, or even a day. When it is again caught, it should be first driven in the same way for a while before the reins are fastened to the bit rings. It will, of course, depend on the temperament of the colt when this alteration will be made. If the colt is taken very quietly the mouth will not become raw and inflamed, a condition that is not only cruel, but altogether against the best interests of the young animal. The next step will be to teach it to lead. A halter may be used, and a light piece of rope passed over the back and around the hind quarters, forming a loop, is the best method. The halter will be held in the left hand, and the two ends of the loop in the right. Do not fasten the ends of the rope forming the loop, and then, should the colt plunge forward when the rope is pulled on to its hind legs, one end can easily be let go, and the loop is off at once. If the colt has not been taught to tie up in its younger days, that lesson may come on at this stage. The breaker will now be guided by the quietness and tractability of his charge before putting it into harness, and perhaps by his ability to ride before mounting it. Whether in saddle or harness, the greatest care must be taken that the colt is not overworked at this early age."

In the discussion which followed, Mr. Watson said that horses bred on the farm and familiarised with human beings were much more tractable than those bred on large runs. Mr. Holloway's suggestions regarding the treatment of foals were admirable. Mr. Innes had experienced trouble in catching frisky horses after they were broken in. He had found it a good plan to give the animal an apple, potato, or some other delicacy it liked, after it was caught and less trouble was experienced next time it was necessary to catch it. In answer to various questions, it was stated that a better mouth was secured by teaching the animal to lead and guide properly than by adopting any special mouthing practice. Mr. Smith had found that when foals were handled and then turned out for a time they did not forget the handling. When working the mares with the reaper and binder he made a practice of catching the foals and tying them to a fence; when they wanted a drink he untied them, and led them to the mares. Another advantage was that, when taught to tie up, they would not plunge about like those that had not been handled when they were being broken in, and were thus less likely to damage themselves. Trotters in America were trained from the time they were 10 months old.

Naracoorte, March 9.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. W. Loller (chair), E. Coe, A. Langeludecke, jun., W. R. Rogers, J. M. Wray, A. Caldwell, C. Bray, and S. H. Schinokel (Hon. Sec.).

FARM MANAGEMENT.—The following paper was contributed by Mr. J. M. Wray:—
 "It is one thing to own a farm, but it is decidedly another thing to manage one properly. In many instances farmers seem to have contracted the idea that so long as they work hard and long and get a lot of land under cultivation, and tear off the wheat in any weather in order to get it done quickly, they are practical farmers; but you will agree that they are very far from it. The day of scratching in wheat with a cultivator, and drilling in newly burnt and cleared ground without any dressing of manure, is past, though this may be done with fair success in the unbroken mallee land in very wet seasons. It is now being recognised that the more the land is nursed and studied the greater the success attained, taking good and bad seasons together. The farmer is successful who is a practical man and an excellent manager. The good manager is a thoughtful man, who counts the cost before he begins the job. He will put a good fence up only where he knows it will be needed until it decays. He will put an outshed up only where he is confident it will remain for all time. No fallowing is done except he can make use of it the coming season. Land is cultivated only under the best conditions, and then only that land which he knows should produce a return sufficient to warrant it being cropped. The good manager will study his soil. At once he recognises some of his land is stronger than other. Some is more suitable for wheat than oats, or oats than wheat, whichever the case may be; or portions of his land, according to his best judgment, would be far more profitable left in its virgin state as a grass paddock than torn up and ruined through intense cultivation. Then, we notice the good manager selects certain portions of his land for cultivation and fences them off, and the rest he reserves as grass paddocks, where he can depend upon having a certain amount of feed under normal conditions. He will select from his section certain portions that may be useful for growing summer fodder, or may be used as a vegetable garden. Every good manager of a farm will attend to these two points. A farm may be a success as a wheat and oat crop producer, but it can still be a greater success if managed so that a return may be obtained from potatoes and onions, or through growing summer fodder for the cows. Every farmer should do his best to grow his own vegetables. A farm is a farm only when it is made to produce all the food which is placed upon the farmer's table, with the exception of tea and sugar. Every farm should keep a good milk cow, and if possible more than one, because there is not a more profitable animal than the cow, and if three or four are properly cared for, at the end of the year the farmer will find that instead of a heavy bill to meet at the local store he has a balance of a pound or two. Some farmers hold the idea that it does not pay to feed cows. Certainly it does not pay to feed bad ones, but as all labor is worthy of its hire, so is a good cow worthy of her feed. The good manager generally will direct special care to the welfare of his horses. He takes particular pains to gather in sufficient hay to ensure his horses being kept in a good, strong working condition. He will see that his horses are so cared for that at any time he can expect a good day's work from them. I have known farmers to take little notice of their

horses until seeding begins, and then they wonder why they are not doing well, seeing that they are feeding them on the best of fodder. But if they had been prepared for the heavy work that was coming the trouble would not result. Let me urge all farmers to feed their stock well. The secret of success on a farm is good management, and the secret of good management is never to start more work than you are able to complete; never undertake more than you can manage, and always do the most profitable and necessary work first. Erect strong substantial buildings, and never put one up in a slipshod way, which will disgust you in a short time and make you long to pull it down again. See that you do not overstock, and thus starve your animals. Always gather a little more hay than is generally consumed. Keep plenty of feed for your fowls, and see that they have good shelter during the winter months. Keep your farmyard clear of all rubbish, and clean and tidy. Keep your fences in good repair, and all these things will add to the value of the farm." In discussing the paper, Mr. Rogers said he knew from experience that it was a difficult matter to select a site for the homestead, and the greatest care should be exercised in this regard. Mr. Schinckel said it was advisable for settlers in new districts to consult the older residents before building their homesteads. It was more economical to erect substantial outbuildings than to put up make-shifts. Good fences, buildings, and stock all paid best in the long run. The Chairman thought every farmer in the district should grow sorghum for summer feed for cows.

SUITABLE DAIRY COWS FOR DISTRICT.—Mr. Wray said the milking Shorthorn was the most profitable cow for this district. It was not so dainty in regard to its food as the Jersey, and returned a good yield of milk. The Chairman thought it advisable to damp all feed intended for cows.

Narrung, March 30.

PRESENT.—MESSRS. S. Bottrill (chair), M. Sullivan, Bowyer, W. H. and W. M. Rumblew, Bolger, Hackett, Williams, H. E. Bottrill, Critchley, Richards, Morgan (Hon. Sec.), and one visitor.

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Members discussed at length the proposal that the system of selling cattle by live weight should be introduced. It was resolved to support the change.

MANURES.—Mr. Hackett contributed the following paper:—"In considering the factors which are essential to make the land more productive in the growth of cereals, in the first place we have to take into account the fact that this locality, although it cannot be called a wheat-growing country, has produced payable crops and is capable of further improvement in this direction. Among the agents necessary to bring this about, potash and nitrogen will play an important part. Before this country was put under cultivation a great part of it was heavily timbered, and after this had been cleared and burned, the land yielded payable crops. The explanation may be in the fact that when sheoak timber is burnt the land receives a large proportion of potash, and is thus provided with one of the necessary constituents for the growth of wheat. This, after a few years of cultivation, may have become exhausted, probably during the late seventies and mid-eighties, before the advent of supers. Subsequently, virgin land was put under cultivation in proximity to lands which had produced payable crops some 20 years previously, and under similar conditions of cultivation, but in no case was the result equal to the earlier crops. The explanation of this is that sheep were grazed on the land for a period of 20 years or more, and as potash is absorbed in the production of wool, here is found another source of exhaustion. I am not desirous of discounting the value of sheep on the farm in clearing the land of weeds or supplying humus; my aim is to show how potash is absorbed from the soil. The late Mr. Eben. Hall, of Lucindale, writing on the subject of deterioration of the land in that locality, where land, after being cropped for a few years, gradually yielded less annually, attributed the first success in cultivation to the potash supplied in the ashes of the timber grubbed out and burnt on the land. Most of the farmers went in for sheep-grazing, and the same fact was noticeable, that in subsequent years virgin land yielded less under corresponding cultivation. This was no doubt caused by the absorption of potash in the production of wool. We believe nitrogen in the soil in conjunction with potash to be the most important factor in the production of crops, and it becomes correspondingly exhausted in the growth of cereals. If we agree that these two constituents are essential for the production of wheat, the next point to consider is how to apply them to the soil so as to secure an immediate benefit.

To mix them in a crude state, say, as nitrate of soda or as potash, would only court defeat. The problem is to find other component parts, so that they may blend in a way that will allow of the plant life directly assimilating them. Potash in ashes is available directly for plant life, as the ashes merge the potash into the soil in such a manner as to allow the plant to readily absorb what it requires without being sickened. Seaweed is another combination which will yield potash to the soil. It is a known fact that leguminous plants, such as clovers, are exceedingly partial to gypsum. I read some years ago of a person in England who, in trying to induce farmers to use gypsum to assist in supplying nitrogen to the soil by the growth of clovers, gave a practical demonstration by planting a field of clover near the roadside and dressing certain portions of it with gypsum. The statement went on to say that the result was that where the gypsum was applied the clover grew from 2ft. to 2ft. 6in. high, and showed a beautiful dark-green in color. Where no application was made it was barely 6in. in height and of a sickly yellow appearance. This demonstrated the affinity between nitrogen-producing plants and gypsum. I noticed that when Dr. Cherry was in South Australia a year or so ago, he was struck with the increased growth of plant life where super. was applied, and instanced clover. It occurred to my mind that gypsum might be used in the manufacture of super. If so, we have a reason for the increase of clover, as a constituent is applied in the super. that is essential to its growth. The black lands, or flats as we call them, around the lakes are impregnated with gypsum, and are favorable to heavy growths of clover. I should advise farmers to experiment by combining potash with ashes or seaweed. Nitrogen should be applied by growing leguminous plants, such as clovers and lupins; or nitrate of soda should be mixed with gypsum, of which we have abundance in our locality. To stimulate the growth of legumes prior to sowing wheat, a dressing of chloride of sodium or common salt from our lagoons would be useful if put on our sandy soil in conjunction with nitrate of soda, as it would tend to keep the soil damp and hold the nitrate in suspension. Sir William Crooks, writing on the future of wheat-growing, reflected on the possibility of the world failing to supply the needs of the users of wheat with the exhaustion of the nitrate beds of Chili. Fortunately, science has discovered that nitrogen is in abundance in the atmosphere surrounding us, and already has begun the problem of capturing it and making it a commercial product; and the members of this Bureau may, though in a humble way, do something in assisting to discover the needs of the soil with profit to themselves and benefit to the world at large." Mr. Bowyer had secured best results after applications of bone manure. Peas was a most profitable crop to grow, as it not only enriched the soil but provided excellent feed for sheep or pigs.

Penola, March 2.

(Average annual rainfall, 26½in.)

PRESENT.—MESSRS. Darwent (chair), Adamson, Peake, McKay, Wilson, Williams, Maxwell, Strong, Warner, Ricketts, and Ockley (Hon. Sec.)

PREPARATION OF THE SEED BED.—The paper read by Mr. D. Adamson at the Conference of the South-Eastern Branches, and printed on page 948 of the April issue, was read and discussed. The Hon. Secretary contended that the greatest enemy the district had to fight was the weeds, most of which were annuals, which necessitated ploughing before the first rains and cultivation after they had germinated. The drawbacks to spring fallow were that it was necessary to work the land right through the early summer to kill the thistles, which would continue to germinate so long as there was sufficient moisture in the ground. If they were allowed to grow, they would have reached maturity by the time the first rains fell, and as a consequence another ploughing would be necessary. The land would be idle all the spring, when natural herbage would be at its best. It was not necessary to conserve moisture in this district. Ploughing in January and February, and cultivation after the first rains, would be quite as effective as spring fallowing, and there would be extra feed available till January. Seed should be in the ground while the soil retained some of its summer warmth in order that the crop might make good headway and overcome any weeds which remained. Mr. Adamson considered that the extra expense of fallow would be amply repaid by the benefits derived from leaving the soil exposed to the sun through the summer. If land were left till January or February to be ploughed, it was probable that thistles would be so advanced that great difficulty would be experienced in forcing the horses through them; when

such was the case he used a pole which was drawn by the horses on the land side of the plough as it proceeded, and which crushed down the thistles and allowed greater freedom for the horses.

BARLEY-GROWING.—Mr. Williams considered the best time to sow barley was August. The ground should be well worked. Autumn-sown barley ran the risk of being spoilt by too much rain during its growth; also early-sown barley seemed more liable to be attacked by grubs than late sown. Duckbill barley would mature in about 15 weeks.

Tatiara, April 6.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. Stanton (chair), Fisher, Prescott, Rae, and Truman (Hon. Sec.).

ROLLING AND HARROWING GROWING CROPS.—The following paper was read by Mr. Rae:—"I am strongly in favor of both rolling and harrowing growing crops. Some crops require rolling, and the harrows are just as necessary for others. For instance, with a crop on heavy land that has been well worked and finished with a smooth surface, the roller would not be of any advantage whatever, but if this crop showed signs of becoming stunted, if it were not too far advanced, a light harrowing would be of great benefit to it by loosening the surface of the ground and preventing it from getting too dry and cracking. A narrow tine should be used, so as to pull out as few plants as possible. If this land had been sown in a rough state and was very lumpy, the use of the roller would be more beneficial. The lumps could be broken to provide a soft layer of soil around the growing plants, which would put the land in a better condition to receive and retain moisture. If the land were of a light or sandy nature, to harrow would do a lot of harm, but to roll would tend to press the loose soil around the roots and assist in retaining the moisture that in all probability would be escaping too rapidly. It would also help the crop to stand better if heavy winds were encountered. If our farmers would combine sheep-raising with wheat-growing, a lot of labor would be saved. The sheep would obviate the necessity of rolling and harrowing, and the crops would be greatly benefited by the droppings. Do not put a few sheep on a crop and leave them there for weeks in rain and shine, but put in as many as possible for a fortnight, about the beginning of July, and then remove them. The earlier the district the earlier must the sheep be removed. About this time the crops are liable to get a severe check from the heavy frosts. If, however, they are fed down the roots have an opportunity to grow stronger, and with the warm weather the plant is forced much quicker than if it were left to become frost-bitten. Of course, the conditions must first be considered; otherwise one is liable to do more harm than good."

AGRICULTURAL PUBLICATIONS.

The following publications have been issued by the Department, and are available for distribution at prices mentioned :—

“Vinegrowers’ Manual,” by A. Sutherland, 6d.; posted, 7d.

Reports of Conferences of Australasian Fruitgrowers held at Brisbane and Wellington, 1s. each; posted, 1s. 1d.

Journal of the Department of Agriculture of South Australia, 1s. per annum in advance to those resident in South Australia; 3d. per copy; and 2s. 6d. per annum in advance to those outside the State.

Any of the following Bulletins and Leaflets may be obtained by sending a penny stamp for postage :—

Agricultural, Miscellaneous: Reports of Agricultural Experiments; Bunt Tests; Roseworthy College Harvest Reports; Amount of Spirits to be Extracted from a Ton of Raisins; Lucerne Hay; Reports on Agricultural Bureau Congress; Irish Potato Blight; House-building in New Districts; Reports on Permanent Experiment Field; Reports on Roseworthy Farm Flocks; Noxious Weeds; Milling Characteristics of Australian Wheats; Milling Qualities of South Australian Wheats; Lucerne Cultivation; Trial of Stone-Gathering Machines; Hints for Intending Irrigationists; Two Blue Weeds; Inquiry into South-Eastern Conditions; Milling Experiments.

Horticulture: Bordeaux Mixture and other Fungicides; Fruit-preserving for Domestic Supplies; Fruit-drying in California; The Codlin Moth; Fruit-drying for Beginners; Fruit Flies; Fruit Maggot-fly Pests; Cider-making; Defects in Export Apples; The Apple Mussel Scale; Select List of Fruit Trees; Preserving, Canning, and Drying Fruits; Plums and Prunes; The Lemon in Sicily; Some Notes on Almonds; Gumming Disease of Peach and Almond Trees; Curculio Beetle; Production of Early Tomatoes; Fertilization of Orchard Lands; Spraying against Codlin Moth; Popular Remedies for Common Diseases in Fruit Trees.

Stock: Stomach and Bowel Disorders of the Horse; The Botfly; Branding of Stock; Worms in Horses.

Dairying: Taints and Flavors in Dairy Produce; List of Dairy Factories; Spaying of Cows; Milking of Cows.

Poultry: Reports of Egg-laying Competitions; Single Testing for Egg Production

“The Poultry Manual” can be obtained by sending 7d. to the Government Printer, Adelaide.

The Journal of Agriculture each month contains items of interest in regard to poultry-raising.

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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Inter-State Conference of Ministers of Agriculture.

Some important questions affecting the interests of producers were discussed by the Inter-State Conference of Ministers of Agriculture which was held in Sydney. On his return from the Conference the South Australian Minister (Hon. T. Pascoe, M.L.C.) gave to the Press an interesting résumé of the proceedings, in the course of which he stated that a resolution from the Australasian Conference of Fruitgrowers to the effect that the whole cost of inter-State inspection of fruit and vegetables should be paid by the State which made the inspection, was rejected by the Ministers, who adopted a like course in respect of a proposal that fruitgrowers should be permitted to attend and make representations at ministerial gatherings of this description. It was decided, however, to inform the fruitgrowers' organization that the Ministers would be glad at any time to consider resolutions which it deemed advisable to submit. A decision arrived at was "That legislation be introduced into all the States to provide for the adoption of uniform fruit cases, as recommended by the Fruitgrowers' Conference." It was resolved to take steps to secure uniform standards of quality in regard to the principal materials and mixtures used in the treatment of animals and plants, such as insecticides or fungicides, and to compel the vendors of these articles to guarantee the contents in the same manner as the sellers of fertilisers are required to. Acts having these objects in view are already in force in the Central State. In due course, the agricultural chemists and other officers concerned in the framing and administration of such provisions will meet to consider the question of the standards to be adopted. When the point was raised the Ministers readily acknowledged that it would be to the advantage of the various agricultural departments if the technical and scientific officers conferred occasionally, and it was agreed that the meetings should be held at intervals of not more than three years.

Fire-Branding Australian Meat.

Referring to the question of fire-branding Australian meat sent overseas, which was discussed at the Conference, the Minister of Agriculture said :— "We want every State to get the full advantage of its own meat. Under existing conditions, owing to Canterbury and English mutton having a good name among the consumers in the old country, the first-grade stuff from

Australia is purchased and sold by the retailers as either Canterbury or English, because it is quite equal to them. Consequently, only the inferior grades reach the consumer as Australian. To obtain a fair deal for our products the Ministers decided that the Federal Government be asked to take into consideration the matter of legislation providing for the fire-branding of meat exported from Australia to ensure that Australian meats are sold as such to the consumer, and supplemented this with a determination to forward the following resolution to the British Board of Trade authorities:— 'That the Conference is of opinion that any provision made for branding meat in England should exclude meat branded under Government supervision in Australia.' I may explain that the Agricultural Produce Marks Bill, which it is intended to reintroduce to the British Parliament, provides that every carcass of imported meat shall be branded 'Foreign' or 'Colonial,' so that when cut up in the ordinary way each separate joint shall bear the whole or any part of these words. That possibly might lead to the disfigurement of the carcasses, but such would not ensue if our idea should be carried into effect—that is, to fire-brand the carcasses with a brand about the size of a half-crown, having a distinguishing mark for each State. In the case of a sheep or a lamb there would be three brands on each side—on the shoulders, the loin, and the leg—and a pig would carry eight marks in all. This system of marking is in vogue at the Melbourne Abattoirs and works admirably."

Tillage is Manure.

The old maxim that "tillage is manure" has been shown to be true at Cornell University farm, where experiments were made in that direction. Some plots of potatoes were cultivated as many as eight times, and in every case the greater the number of times the plants were cultivated the larger the yields compared with plots on which fewer cultivations were given. The level culture was better than hilling. Two lots, cultivated eight times, left perfectly level through the season, produced at the rate of 384bush. and 357bush. per acre, and three lots, cultivated five times, produced 349bush., 325bush., and 288bush., the last lot being hilled at the final cultivation. The different varieties used showed that the same results could not be expected from all of them, but sufficient evidence was secured to demonstrate that level cultivation, and keeping the ground loose, were important matters in growing potatoes. Also that spraying the leaves, in order to protect against potato beetles, at the proper times, largely influenced the yields, as less damage to the vines resulted. Some lots that were cultivated only three times showed a large falling off in yield.—*The Queenslander*.

Import Duty on Artificial Manures.

The agitation in certain quarters to induce the Federal Parliament to place an import duty of 10s. per ton on artificial manures was one of the subjects which came before the inter-State Conference of Ministers of Agriculture, it being decided to refer the matter for discussion at the next Premiers' Conference. In the course of an interview, the South Australian Minister of Agriculture (Hon. T. Pascoe, M.L.C.) gave some particulars showing the extent to which artificial manures are employed in Australia. "In 1910," he said, "225,000 tons of manure were imported into the Commonwealth, and the quantity distributed over the land was between 300,000 tons and 350,000 tons. An increase of 10s. a ton in the price—for that is what the import duty would amount to—would therefore mean a direct tax upon the producers of more than £150,000 per annum."

American Prize Wheat.

The thousand-dollar prize awarded in New York City recently for the best wheat grown on the North American continent, which was secured by a Saskatchewan farmer, was won by Marquis wheat. Marquis wheat is one of a number of varieties which have been produced at the Government experimental farm at Ottawa by a crossing of Red Fife with various imported wheats of early-ripening habit. The early-maturing parent of Marquis was Hard Red Calcutta, obtained from India. It was isolated by Dr. Saunders, the Dominion cerealist, by selection, in 1903. After being grown for three years at Ottawa, baking tests were made from the crop in 1906, which showed that Marquis stands in the first rank for baking strength. This wheat was then transferred to the experimental farm at Indian Head for tests under prairie conditions, where, from larger tests in the field, Marquis gave 42bush. per acre, while in 1909 and 1910 five-acre lots at Indian Head yielded more than 53bush. an acre.—*The Pastoralists' Review*.

Lucerne.

Regarding the needs of lucerne, we could almost sum the matter up in four words—lime, drainage, humus, and inoculation. Perhaps we have given them in the order of their relative importance. Lime is necessary on soils not naturally of limestone formation or filled with limestone pebbles. The importance of this is impressed on us more and more each year; in fact, we believe to-day that there have been more failures throughout the United States on account of insufficient lime in the soil than from any other cause. Then as to drainage: there is no use in planting lucerne on any soil where

water may ordinarily be found at a depth of less than 3ft. The lucerne may grow all right until its roots strike this water, but then it will die. Fertile soils contain enough humus, impoverished soils may be so deficient that special preparation must be made before lucerne can possibly succeed. Where stable manure is not available, on impoverished soils we would recommend preparation for lucerne one or two years in advance, growing such crops as crimson clover, mammoth clover, cow peas, Canada field peas, or soja beans, and preferably turning them under, or else pasturing them off, so as to give the soil the greatest benefit possible from them. We recommend inoculation, not that it is always necessary, but it is an inexpensive process, and in five cases out of six it will actually pay.—*Irrigation Age*, Chicago.

A Word for Farmers' Experiments,

That which is seen makes a deeper impression than that which is only described; hence, object lessons are found to be of the greatest advantage in schools. The same principle holds good with grown-up people. Results that come direct to our eyes are far more convincing than results described in the reports of agricultural stations. If a farmer carries out a simple experiment on his own fields, the results come home to him in the most convincing way. It is, therefore, a good suggestion that every farmer should make at least one experiment a year in order to test the requirements of his soil and the effect of different fertilisers, and if several farmers would co-operate in an experiment the results could not fail to be very valuable.—*Mark Lane Express*.

Burning Stubble.

The important question of the time fixed by Act when stubble may be burnt is to come before the Annual Congress of the Agricultural Bureau in September next. The position at present is that there are no restrictions as to the burning of stubble in any part of the State between May 1st and October 31st, but under the Bush Fires Act, No. 357 of 1885, the following are constituted offences punishable by a fine of not less than £3 and not exceeding £20:—“Burning stubble between November 1st and April 30th, unless between 12 noon and 6 in the afternoon, or during the hours fixed by district council; or without giving neighbors (or, in hundreds, to nearest police constable) one day's notice; or without having at least four adult persons present to assist in preventing spread of fire; or without ploughing or clearing at least eight feet round inside the fence or boundary.” It is also an offence to light a fire for the purpose of burning stubble on a Sunday. The matter was

brought before the Advisory Board of Agriculture at its meeting on March 13th, by a request from the Utera Plains Branch of the Bureau, that the Board should "ascertain from the other Branches whether they are in favor of legislation being enacted to allow all district councils to fix the days and hours when stubble may be burnt." The question was referred by the Board to the Annual Congress, and it will therefore be advisable for the various Branches to consider the matter, so that their views may be properly represented by the delegates.

Money in Stinging Nettles.

It has long been known that a workable fibre could be obtained from the common nettle, but hitherto it has been found impossible to extract the fibre in a form or at a price which would render it marketable. It is now reported that a process has been invented which gives excellent economic results, says the *Rubber World*. After drying and the removal of leaves, &c., the stems are boiled in dilute soda lye, the fibre then being separated by a revolving brush. The subsequent treatment involves repeated boiling in dilute lye and thorough washing, both under high pressure. The resulting fibre, it is said, gives a yarn inferior to flax, but superior to jute and hemp. There are several by-products of economic value. Nettle-fibre yarn is reputed to be excellent for heavy goods, especially brocades and damasks requiring a brilliant sheen. If, as is stated, the nettle is easily cultivated, and the yields per acre high, and if the process described is as effective as is claimed, a new industry of high importance would seem to be in sight. With reference to the simple cultivation promised, we may say that, so far as our own observation goes, we should have thought the nettle required a good soil, as it is found most frequently in England growing in the rich soil of ditches, or in hollows where natural manures are apt to collect.

Argentina Lamb Export Trade.

The lamb export figures from Argentina for the last four or five years have (says *The Pastoralists' Review*) shown a continuous increase, and if this increase assumes considerable proportions it will surely in time have the effect of steadying, if not of reducing, the values obtainable for Australian and New Zealand lamb in the London market, the very best grades, perhaps, excepted. It used to be thought that Argentina was not well adapted to growing the English grasses necessary for fattening, and that therefore it would never become a serious factor in the lamb export trade of the Southern Hemisphere.

That such a belief was fallacious is being proved by the rapid strides which have been made in the direction of building up a trade with the old country in frozen lamb. In 1907 the export of lamb from all parts of South America amounted to 110,000 carcasses. In 1909 518,000, and in 1911 1,092,000 were exported. These figures, although not large in comparison with Australasian exports, are still large enough to make an impression on the market, and especially as the supply is fairly regular. From the figures quoted South America is apparently quite able to develop a big export trade in lamb, and, remembering what the country has done in the past in other departments of the meat trade, it behoves Australia and New Zealand producers to spare no effort to raise the standard of quality if they wish to maintain the position they now hold.

Water in the Soil.

Many experiments have been made upon different kinds of crops, and the amount of water required to produce a pound of dry matter varies greatly. These tests indicate that 200lbs. of water will be necessary to produce a pound of dry matter, while in other cases as high as 800lbs. or 900lbs. will be necessary. Such a variation is due to the climatic conditions, locality, kind of crop, and kind of soil. In the humid regions less water is required than in the arid country, and this fact partly explains why a greater amount of water must be held in the soil in our irrigated districts of the west. Wheat, in all probability, will require less water per pound of dry matter than oats, and alfalfa requires more than oats. If we assume that an average crop requires 400lbs. of water to produce 1lb. of dry matter, and in the case of alfalfa, which produced 4 tons per acre for the season, will require for the above average about 51,200 cubic feet of water, or a depth of a little over 14in. over the entire acre. This amount of water must be held in the soil particles as free water available for the plant growth. A good soil must be of such a nature as to act as a reservoir and at the same time supply the necessary chemical constituents to the plant.—*Mark Lane Express.*



GRAPE VINE PRUNING FOR AMATEURS AND BEGINNERS.

By GEO. QUINN, Horticultural Instructor.

THE STRUCTURE OF THE SHOOT OR CANE.

The structure of the wood of the grape vine, and more particularly of the ripe annual shoots, technically known as "canes," with which the pruner is chiefly concerned, differs from that of any other kind of fruiting plant which has been heretofore described. In these shoots we meet for the first time a clearly defined division of the cane into nodes and internodes in the internal more than in the external structure.

If Fig. 1 be examined it will be seen the internode consists of a large central pith enclosed in an encircling layer of woody tissue, which in turn is enveloped in a thin, closely adhering covering of bark, composed of continuous and closely packed parallel fibres. The node, on the other hand, holds no central pith, its place being occupied by a wedge-shaped septum, composed of a mass of partially lignified tissue less fibrous in character than the external layers which surround it. Upon the external woody tissue, where the upper edge of this wedge joins it, the bud is attached. The bark casing at the point of emergence of the bud is differentiated into a number of scales, which fold together and completely envelop the embryo shoot, which, wrapped in a mass of protecting hair-like fibres, is contained therein.

The value of this non-pithy septum, or diaphragm, as a protection for the more readily decomposed pith has long been recognised in vine-growing countries, and the section at the base of a cutting is made through it, if any portion of a cane other than that which has been attached to an older shoot is used. In wet countries the pruners often cut through these woody divisions when severing canes, but this precaution does not appear to be necessary under Australian conditions, in so far as avoiding decay is concerned.

Physiologists claim to prove that the bud is—for nutritive purposes—primarily connected with the internode above it, and that when the bud starts in the spring-time it withdraws the stored nutriment which has rested in the internode immediately above it. Hence, it is claimed that a measure of gain may be secured to the vine by cutting through the node. Whether

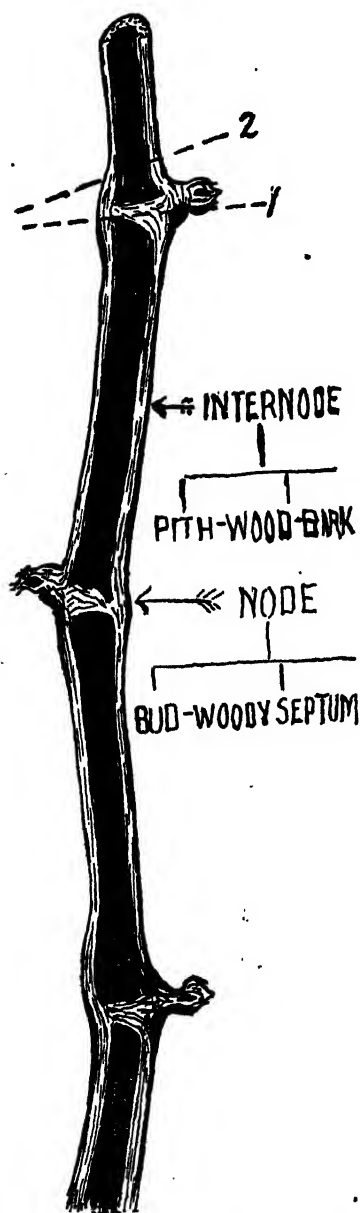


FIG. 1.—Longitudinal Section of Vine Cane, showing positions for Pruning at 1 and 2.

arises the main arm or arms, and from these again are developed the secondary arms. The stem and the main arm alone are claimed to be the permanent parts, as the secondary arm, whether on bush or trellised vines, invariably

the vine be benefited sufficiently to compensate the owner for the extra labor incurred in severing these dead terminals at the next winter's pruning is open to question, but the possibility of injury to the grape vine during tillage operations is certainly increased by the long projecting internodes, more especially if left upon bush vines.

On the other hand, wherever bush vines have rods left upon them or the canes of trellised vines are systematically tied, these terminal internodes present a distinct advantage in permitting secure tying without constriction of the cane taking place, and consequent stunting of those growths arising from buds which may be located beyond the position of the ties. Competent authorities are agreed, however, that when the section is made through the internode it should slope away from the bud, but at the same time it should not be made as close down to the bud as is recommended in pruning fruit trees, owing to there being a greater danger of the shoot arising from the topmost bud on the grape vine cane blowing off under strong wind pressure.

THE PARTS OF THE VINE.

In Fig. 2 a diagrammatic grape vine is given. It is meant to convey in graphic terms the nomenclature which is applied to the various parts of a fully-grown grape vine, whether it be trained as a bush or in trellised form.

Arising from the soil, we have the trunk or main stem. From this, in turn,

extends through the annual increments gained from each winter's pruning until its renewal becomes a necessity (see Figs. 3 and 4). From the secondary arm arises those annual shoots or canes which are most valuable on account of bearing buds which produce the crop in the coming summer; hence, they may be called the fruiting wood. A further examination of our diagram reveals the presence of other annual growths which do not take their rise from the ends of the secondary arms, but they come direct out of the stem or main arm, or may be they arise from older portions of the secondary arms. These growths are technically known as water-shoots. This is owing to their great vigor of growth and because they emerge from wood more than one season older than themselves. These water-shoots do not as

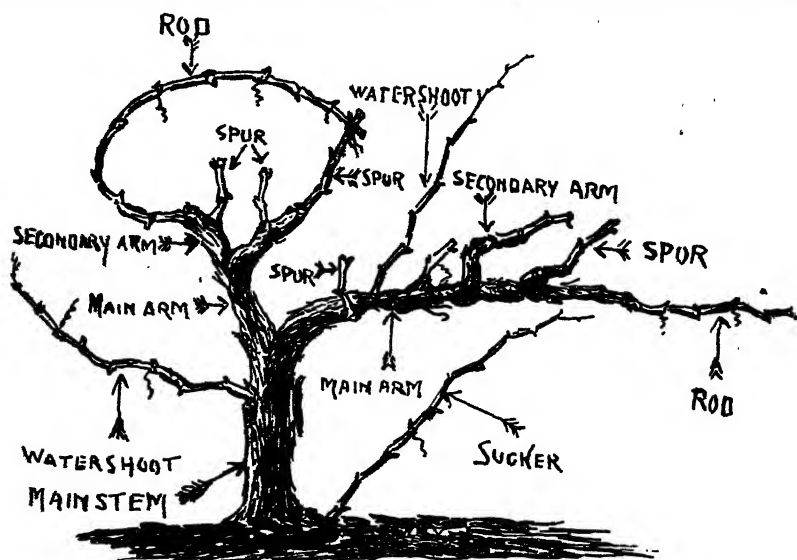


FIG. 2. Diagram of the Parts of a Grape-Vine.

a rule carry buds from which fruit can be expected in the following summer, consequently they are not relied upon as fruit bearers. They possess, however, two points of value—firstly, if a gap exists in the framework, an arm to fill it may be developed from the water-shoot; or in the case of secondary arms or spurs becoming exaggerated in length, a properly placed water-shoot affords an opportunity of renewing the said arm or spur (see Figs. 3 and 4). If the water-shoot is not needed for either of the above purposes it is completely suppressed. The second value attributable to the water-shoot is instructional, because its presence—and more particularly if in numbers—indicates incorrect judgment on the part of the pruner. In the latter case it shows most clearly the vigor of the vine has been underestimated in the number of buds left upon it at the winter pruning (see Fig. 5).

Another type of annual shoot, seen in our diagram, arises from the soil. This comes from a subterranean bud upon the buried portion of the stem. It is called in viticultural parlance a sucker, though more correctly speaking it is an offset. This shoot has no value, excepting the top of the parent vine be irreparably damaged, necessitating a complete removal of the stem, when the so-called sucker may be trained into the position formerly occupied by its parent. This, of course, is only adopted when the decapitated vine was originally grown from a cutting.



FIG. 3. Trellised Vine.

Reduce Old Secondary Arms at the Dotted Lines.

We are now in a position to sum up the parts of the vine : The main stem, the main arms (permanent parts) ; secondary arms, fruit shoots, water-shoots, suckers (temporary parts).

RESPECTIVE VALUES.

The main stem supports the framework, lifting it the desired height above the soil. The main arm supports the secondary arms, which carry the annual fruiting shoots. The water-shoot and sucker have values as replacing shoots under certain circumstances only.

THE TREATMENT OF THE FRUITING WOOD.

An examination of our diagram shows that those shoots which have arisen from what has been retained of the growth of the previous season are pruned, but they have not been all treated alike. Some have been cut so that only two buds are visible upon them, whilst others have been bent over in the shape of an arch, or tied straight out horizontally. These are the portions of the canes retained after pruning takes place, and they are technically known as spurs and rods respectively. We may therefore define a spur as a portion of the last season's wood carrying from one to three buds. In noting the



FIG. 4. Bush Vine.
Extended Secondary Arms to be Cut Off on Dotted Lines.

buds, only those between which distinct internodes may be seen are counted. Consequently, such as may be placed in the angle where the young shoot joins the previous season's wood are not taken into consideration. A rod has been described as a portion of the previous summer's cane, possessing from 10 to 16 buds; but it would be more clearly described as a portion of such a shoot carrying a greater number of buds than a spur, as in practice the rods chosen often do not possess 10 buds.

It would be simpler, if it were possible, to prune all grape vine canes into spurs, but as the object of growing the vine is the production of grapes, the habit of bearing peculiar to each variety must be kept in mind. Observations made over many years go to show that under normal conditions of growth some vines produce the buds upon the lower ends of their annual canes, from which alone shoots arise bearing bunches of flowers. On the other hand some kinds—usually those capable of displaying great vigor of vegetation—produce their flower-bearing branches from buds situated well out along the cane. Others, again, produce bunches more or less all along the



FIG. 5. Hard Pruning applied to a Vigorous Vine results in many Watershoots.

ripened canes. These observations have led vinegrowers to classify their varieties into spur-pruned and rod-pruned types. It should be observed, however, that a vine which is rod pruned entirely is never found. Owing to the necessity for constantly renewing the fruiting wood and keeping the development of the framework of the plant within proper bounds spur pruning, either wholly or in part, must be resorted to.

In practice, a very vigorous vine of the spur-pruned section should not only be permitted to retain a greater number of spurs, but each spur may also

carry the full number of buds, whereas a weak vine of the same variety should have its spurs in reduced numbers, and each spur may be reduced to one or two buds. If the pruner misjudges the capabilities of the vine, be it rod or spur pruned, he should, by leaving a greater number of spurs and buds, reap a harvest of numerous, but inferior fruit, and obtain only weakly shoots to supply the next season's fruiting wood. On the other hand, too severe suppression results in forcing dormant or adventitious buds to grow out into water-shoots, or possibly suckers. (See Fig. 5). The happy medium secures fine quality fruit along with strong, well-ripened canes for next year's operations. Generally speaking, for table grapes or raisins it is desirable to prune hard to keep up the quality of the fruit, although water-shoots occur with moderate frequency. In the case of grapes for wine-making leading authorities affirm that in good strong soils where the vines are vigorous, rod-pruning is applicable to most of the varieties usually classed among those spur pruned. On the other hand, when subjected to artificial modes of restricting the sap, such as "cincturing" or "ringing," now so widely applied to the Zante Currant, spur pruning alone affords the best results.

The following is a classification of the methods of pruning applied to some of the leading varieties :—

Spur Pruned.—Aramon, Black Hamburg, Black Alicante, Black Malaga, Black Frontignan, Black Mammoth, Belas Blanco, Buckland Sweetwater, Carignane, Chasselas, Doradillo, Dolcetto, Duke of Buccleugh, Early Green, Gros Colman, Grand Turk, Grenache, Gamay, Gouais, Lady Downes' Seedling, Lady's Finger, Mataro, Muscat Gordo Blanco, Muscat Alexandria, Muscat Hamburg, Madresfield, Court Black Muscat, Pedro Ximenes, Pride of Australia, Palomino Blanco, Red Prince, Royal Ascot, Royal Muscadine, Red Malaga, Sweetwater, Santa Paula, Trebbiano, Trentham Black, Temperanc, Ulliade, Verdelho, Wortley Hall.

Rod Pruned.—Crystal, Carbenet, Centennial, Daria or Ohanez, Malbeck, Pinot, Quick's Seedling (Cornelian), Raisin des Dames, Riesling, Sultana, Shiraz, Sauvignon, Waltham Cross, Sercial.

Rod or Spur Pruned.—Black Prince, Black Frontignan, Black Malaga, Corinth Currant, Mrs. Pines' Black Muscat, Red Malaga, Red Frontignan, Trentham Black, Zante Currant.

(To be continued.)

THE AGRICULTURAL BUREAU.

In view of the fact that South Australia is principally a primary producing country, there is probably no institution in the State which serves a more beneficial purpose than does the Agricultural Bureau. To-day there are more branches of the organization than ever before in its history, which in itself is evidence that its usefulness is recognised by the producers. Apart from that, however, we have it on the authority of those qualified to express an opinion, that the methods of culture and the appurtenances which are usually attached to a farm are much better in districts where there is a live Branch of the Bureau than in those where no such institution exists. The Director of Agriculture (Mr. Wm. Lowrie, M.A., B.Sc.) expressed himself at the last Annual Congress in no uncertain terms as to the usefulness of the Bureau, and the Minister of Agriculture has been for many years an active member of the Branch in the district in which he formerly resided.

One reason why the organization should and does appeal to producers is because, having once formed a Branch, it is, within certain broad limits, their own to conduct exactly as they like. Should, for instance, the district be devoted to fruit-growing, the members can, by the interchange of experiences and the arranging of pruning demonstrations, &c., apply themselves, and rely in getting all possible help from the experts attached to the department to pushing forward the particular phase of production in which they are interested. So it is in regard to all the activities of the Bureau; the members themselves decide exactly what form these shall take, and in addition may, through the Advisory Board of Agriculture, bring their views on any subject before the authorities concerned.

There can be little doubt that the good work accomplished in the past by the Bureau was largely instrumental in leading the Scotch Commission, in their report on Australia, to declare that, "Taken all over, South Australia perhaps stands first in methods of culture, class of work, and the quality of its grain." The Bureau, however, is a progressive organization; not content to rest on past achievements, and, to quote the Director of Agriculture, "There is no man in South Australia, however well-informed he may be in matters pertaining to agriculture, who would not benefit by carefully reading the reports of the different meetings of the Bureau." If this is true—and of that there can be no question—how much greater is the benefit to be derived from attending the meetings and participating in the discussions.

Branches of the Agricultural Bureau are evidently fully alive to the wisdom of arranging district conferences from time to time. The past year or two has seen

the revival of the Upper North Conference and the inauguration of such a fixture for the Yorke's Peninsula Branches. The West Coast Branches in the vicinity of Fowler's Bay met in conference last year, and are now arranging to hold a conference in August at Cowell, or some equally convenient place. Movements have also been made in the Pinnaroo District in the direction of arranging for a conference some time before the Annual Congress of the Bureau, which is held in Adelaide in September.

The number of Branches of the Bureau at present in active existence is 132; of these 20 were opened during the past 12 months, and others are in process of formation. Some of the new Branches started with a membership of 50 and 60, and the total number of members is now 2,810. One pleasing feature in connection with the organization is the comparatively large number of Branches in the newer settled districts.

The Bureau brings the Agricultural Department into direct relation with the men on the land, and provides a common ground for the officers of the department and the primary producer to meet together and discuss the problems which continually confront the agriculturist. Under the auspices of the Bureau some 50 or 60 lectures or demonstrations were, during the past 12 months, given by the officers of the Agricultural and Veterinary Departments; and, in addition, other lectures were delivered in places where no Branch of the Bureau at present exists. Scores of questions, and many plants for identification, are sent through the Bureau every week to the department, and the advice of the veterinary officers in regard to diseases of stock is continually being sought.

On the other hand, experiments are conducted for the department by members of the Bureau. The results of these are frequently published, and, together with those conducted by members on their own account, must have an educational effect, not alone in the district concerned but throughout the State. Much more might be written of the benefits derived from the institution, but it is hoped that this short article will induce non-members associated with primary production, in whatever direction, to join an existing or form a new Branch.



AGRICULTURAL STATISTICS.

RESULTS FOR SEASON 1911-12.

WHEAT AVERAGE, 9-29 BUSHELS.

The Government Statist (Mr. L. H. Sholl C.M.G.) has published the final results of the last harvest of cereal, hay, and fodder crops in South Australia. In view of the fact that the growing period was exceptionally dry, the wheat return, being 20,352,720bush., taken off 2,190,782 acres, or an average of 9-29bush. per acre, must be regarded as satisfactory, and is an indication of the improved methods of culture. The official forecast of the wheat yield issued in November last was 20,680,640bush. from 2,168,700 acres, or 9-54 bushels per acre, and the fact that the actual results are so near those predicted must be gratifying to the Government Statist, the compiler of the statistics (Mr. W. L. Johnston), and all concerned.

The total yield was 3,992,020bush. below that of the previous season, and 1,320,188bush. below the mean for the past five seasons. The area reaped for wheat shows an increase over the preceding year, the figures being 2,190,782 acres in 1911-12 and 2,104,717 acres in 1910-11. The total under cereals in 1911-12 was 2,907,182 acres, and under wheat (for both grain and hay) 2,607,206 acres. The area reaped for wheaten hay was 401,648 acres, the average return per acre being 1-18 per ton. Barley of all kinds averaged 17-25bush. per acre, as against 15-79bush. per acre in the previous year. The yield of oats was 1,349,480bush., constituting a record for the State. Below will be found further details taken from the report—

WEATHER CONDITIONS.

As will be observed from the following details of rainfall, the year 1911 was an exceptionally dry one, the first serviceable rains not falling until early in May. The total fall for the six months—April to September—being only 12-55in., or 2-43in. below the mean for the last 51 years—

AVERAGE MONTHLY RAINFALL OVER AGRICULTURAL AREAS.

Period.	April.	May.	June.	July.	Aug.	Sept.	Total Six Months.	Oct.	Nov.
	In.	In.	In.	In.	In.	In.	In.	In.	In.
1911.....	·52	2-84	3-01	2-35	1-34	2-49	12-55	·92	·22
1910.....	·36	4-06	3-19	4-56	2-18	3-39	17-74	2-30	1-73
Mean for 51 years..	1-74	2-64	3-05	2-85	2-58	2-12	14-98	1-81	1-06

In the Upper North Division the rainfall only averaged 9-60in. for the year, and as a result a large area under wheat proved a total failure, and about 4,000 acres were fed off.

In the Central and South-Eastern Divisions the counties bordering the River Murray and the Pinnaroo district yielded very low averages owing to the shortage of rain.

CEREAL CULTIVATION.—ACREAGE.

(Figures in parentheses are those of the previous season.)

The total acreage under all kinds of cereals for grain, hay, fodder, &c., was 2,907,182 (2,689,607) acres, an increase of 217,575 acres.

The following table shows the distribution of the area in comparison with the previous season :—

Division of State.	Total Area under Cereal Cultivation.	Total Area Sown for all purposes with—			
		Wheat.	Barley.	Oats.	All Other Cereals.
	Acres.	Acres.	Acres.	Acres.	Acres.
I. Central	962,724 (899,984)	823,242 (786,134)	26,774 (21,438)	95,623 (76,385)	17,085 (16,027)
II. Lower North	734,302 (696,076)	684,549 (656,494)	2,257 (2,230)	40,913 (29,954)	6,583 (7,398)
III. Upper North	323,973 (319,697)	319,147 (314,085)	327 (196)	2,691 (3,450)	1,808 (1,966)
IV. South-Eastern	378,055 (345,740)	312,149 (285,468)	12,133 (11,361)	48,069 (43,101)	5,704 (5,810)
V. Western	508,128 (428,110)	468,119 (402,000)	2,125 (2,859)	37,485 (22,825)	399 (426)
Total 1911-12	2,907,182	2,607,206	43,616	224,781	31,579
Total 1910-11	2,689,607	2,444,181	38,084	175,715	31,627
Increase or Decrease	217,575	163,025	5,532	49,066	— 48

FALLOW.

The Central and Upper North Divisions show a substantial decrease in the area in fallow, though good increases are recorded in the other divisions. The following are the details :—Central, 460,315 (495,706) acres; Lower North, 534,043 (529,401) acres; Upper North, 200,640 (213,846) acres; South-Eastern, 48,272 (34,008) acres; Western, 101,396 (96,241) acres. The total area being 1,344,666 (1,369,242) acres, a decrease of 24,576 acres.

PRODUCTION.

The following is a summary of the total yields and averages of the chief cereal and hay crops in comparison with the crops of the previous season :—

Kind of Crop.	Seasons.				Increase or Decrease.	
	1910-11.		1911-12.			
CEREALS—	Bush.	Avge.	Bush.	Avge.	Bush	Avge.
Wheat	24,344,740	11-57	20,352,720	9-29	- 3,992,020	— 2-28
Barley (all kinds) .	544,471	15-79	702,855	17-25	158,384	1-46
“ Malting ...	344,665	14-83	484,951	17-06	140,286	2-23
“ Cane	186,912	18-59	208,012	18-31	21,100	— 0-28
“ Other	12,894	11-01	9,892	10-27	— 3,002	— 0-74
Oats	1,136,618	14-63	1,349,480	12-51	212,862	— 2-12
Rye	7,851	7-53	6,864	7-31	— 987	— 0-22
Peas	188,786	19-61	156,522	13-24	— 32,264	— 6-37
HAY—	Tons.		Tons.		Tons.	
All kinds	595,064	1-35	605,239	1-16	10,175	— 0-19
Wheaten	464,048	1-38	475,782	1-18	11,734	— 0-20
Oaten	121,017	1-26	120,629	1-07	— 388	— 0-19
STRAW—						
All kinds	17,393	—	15,955	—	— 1,436	—
Wheaten	12,567	—	10,416	—	— 2,151	—

Oats.—Though the average per acre (12·51bush.) was low, a total yield of 1,349,480bush. of oats is a record for the State, the previous best yield being in 1908-9, when 1,280,235 bushels were reaped, with an average per acre of 16·31bush.

Barley.—The yield of 702,855bush. of barley, with the splendid average of 17·25bush. per acre, is very satisfactory. It is the second best yield for the State, the record crop of 825,740bush., with 18·39bush. per acre, having been reaped in the season 1908-9.

Hay.—Though the average yield of hay per acre (1·16 tons) is the lowest since the season of 1907-8, the yield of 605,239 tons is 10,175 tons above the yield of the previous season, and establishes a record in hay.

VALUE OF WHEAT CULTIVATION.

To show the importance of the wheat harvest to the State, it may be mentioned that the production of grain for each of the last five years has averaged 21,672,908bush. (11·30bush. per acre), and, inclusive of the wheaten hay crop, the mean annual value for the five seasons was £5,199,016, the value of the 1911-12 wheaten grain and hay crop on the average prices to date being £5,410,005.

The Lower North Division has averaged during each of the last five seasons 7,641,068 bushels, or 14·01bush. per acre.

The following tables show particulars of wheat culture in each division of the State for the season 1911-12, contrasted with the mean of the last five seasons :—

ACREAGE UNDER WHEAT FOR GRAIN ONLY.

Season.	Total for State.	I. Central.	DIVISIONS OF STATE.			V. Western.
			II. Lower North.	III. Upper North.	IV. South-Eastern.	
1911-12	Acres. 2,190,782	Acres. 635,924	Acres. 579,419	Acres. 272,014	Acres. 280,861	Acres. 422,564
Mean last five seasons	1,927,698	587,493	545,780	285,478	185,523	323,424

TOTAL WHEAT PRODUCTION.

	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
1911-12	20,852,720	6,435,695	7,227,398	1,928,812	1,433,139	3,327,676
Mean last five seasons	21,672,908	7,009,765	7,641,068	2,720,505	1,626,081	2,675,489

AVERAGE YIELD PER ACRE.

	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
1911-12	9·29	10·12	12·47	7·09	5·10	7·87
Mean last five seasons	11·30	11·96	14·01	9·59	9·13	8·24

WHEAT FOR GRAIN.

Division and County.	Area Sown.		Produce.		Average Yield per Acre.	
	1910-11.	1911-12.	1910-11.	1911-12.	1910-11.	1911-12.
I. CENTRAL—	Acres.	Acres.	Bush.	Bush.	Bush.	Bush.
Adelaide	15,204	10,899	159,751	133,967	10-51	12-29
Albert	58,171	75,115	510,154	378,324	8-77	5-04
Alfred	40,094	54,536	532,170	409,998	13-27	7-52
Carnarvon	3,443	1,695	11,716	9,882	3-40	5-83
Eyre	63,591	61,848	734,714	437,912	11-55	7-08
Fergusson	142,644	143,639	1,904,675	1,794,806	13-35	12-50
Gawler	123,863	115,921	1,558,952	1,406,131	12-59	12-13
Hindmarsh	24,104	17,347	188,594	154,250	7-82	8-89
Light	96,470	91,401	1,230,065	1,308,568	13-27	14-32
Sturt	66,658	63,523	582,145	401,857	8-73	6-33
Total	634,942	635,924	7,462,936	6,435,695	11-77	10-12
Increase.	—	1,682	—	—	—	—
Decrease	—	—	—	1,027,241	—	1-65
II. LOWER NORTH						
Burra	23,541	25,372	390,637	261,969	16-59	10-33
Daly	224,596	214,064	2,792,231	2,468,994	12-43	11-53
Hamley	170	200	1,500	600	8-82	3-00
Kimberley	14,017	15,038	167,130	96,910	11-92	6-44
Stanley	169,485	180,785	2,523,463	2,505,816	14-89	13-86
Victoria	134,553	137,915	1,888,492	1,867,618	14-04	13-54
Young	5,279	6,045	37,915	25,491	7-18	4-22
Total	571,641	579,419	7,801,368	7,227,398	13-65	12-47
Increase	—	7,778	—	—	—	—
Decrease	—	—	—	573,970	—	1-18
III. UPPER NORTH						
Blachford	7,799	9,214	64,205	20,434	8-23	2-22
Dalhousie	81,642	80,697	1,004,687	706,374	12-31	8-75
Derby	—	—	—	—	—	—
Frome	106,975	112,043	1,403,153	905,319	13-12	8-08
Granville	13,976	14,183	126,453	36,411	9-05	2-57
Hanson	21,699	23,196	165,177	67,850	7-61	2-93
Herbert	7,707	9,973	105,050	95,363	13-63	9-56
Lytton	—	—	—	—	—	—
Newcastle	28,222	22,583	312,160	96,881	11-06	4-29
Taunton	—	115	—	180	—	1-57
Total	268,020	279,014	3,180,885	1,928,812	11-87	7-09
Increase	—	3,994	—	—	—	—
Decrease	—	—	—	1,252,073	—	4-78

WHEAT FOR GRAIN—continued.

Division and County.	Area Sown.		Produce.		Average Yield per Acre.	
	1910-11.	1911-12.	1910-11.	1911-12.	1910-11.	1911-12.
	Acres.	Acres.	Bush.	Bush.	Bush.	Bush.
IV. STR.-EASTERN						
Buceleuch . . .	46,082	51,650	375,518	175,400	8-15	3-40
Buckingham . .	27,502	30,223	292,551	207,988	10-64	6-88
Cardwell . . .	2,908	4,535	17,525	14,922	6-03	3-29
Chandos	133,220	151,200	1,580,943	753,538	11-87	4-98
Grey	11,924	3,190	112,138	40,373	9-40	12-66
MacDonnell . . .	8,464	5,870	54,330	48,637	6-42	8-29
Robe	8,468	7,344	62,137	69,706	7-34	9-49
Russell	24,751	26,849	174,715	122,575	7-06	4-56
Total . . .	263,319	280,861	2,669,857	1,433,139	10-14	5-10
Increase	—	17,542	—	—	—	—
Decrease	—	—	—	1,236,718	—	5-04
V. WESTERN—						
Buxton	60	86	988	246	16-47	2-86
Dufferin	7,458	11,173	57,687	76,923	7-73	6-88
Flinders	72,331	79,574	593,143	610,007	8-20	7-67
Hopetoun	8,964	12,957	75,073	125,391	8-37	9-68
Jervois	98,063	125,166	906,165	946,442	9-24	7-56
Kintore	22,763	23,082	117,052	178,500	5-14	7-73
La Hunte	355	420	3,700	4,600	10-42	10-95
Manchester . . .	135	130	1,140	900	8-44	6-92
Musgrave	21,105	24,915	202,161	219,541	9-58	8-81
Robinson	61,819	60,858	598,774	567,537	9-69	9-33
Way	74,397	83,787	673,211	593,689	9-05	7-09
York	45	416	600	3,900	13-33	9-37
Total . . .	367,495	422,564	3,229,694	3,327,676	8-79	7-87
Increase	—	55,069	—	97,982	—	—
Decrease	—	—	—	—	—	0-92
SUMMARY.						
I. CENTRAL . . .	634,242	635,924	7,462,936	6,435,695	11-77	10-12
II. LOWER NORTH	571,641	579,419	7,801,368	7,227,398	13-65	12-47
III. UPPER NORTH	268,020	272,014	3,180,885	1,928,812	11-87	7-09
IV. STR.-EASTERN	263,319	280,861	2,669,857	1,433,139	10-14	5-10
V. WESTERN . .	367,495	422,564	3,229,694	3,327,676	8-79	7-87
GRAND TOTAL	2,104,717	2,190,782	24,344,740	20,352,720	11-57	9-29
Increase	—	86,065	—	—	—	—
Decrease	—	—	—	3,992,020	—	2-28

WHEAT FOR HAY.

Division and County.	Area Sown.	Produce.		Average Yield per Acre.		Rainfall (Approximate Mean).	
	1911-12.	1910-11.	1911-12.	1910-11.	1911-12.	1910.	1911.
	Acres.	Tons.	Tons.	Tons.	Tons.	In.	In.
I. CENTRAL—							
Adelaide	41,304	64,253	65,282	1.62	1.53	33.21	22.79
Albert	9,040	5,280	5,086	1.06	.56	15.92	10.60
Alfred	7,761	6,650	6,297	1.54	.81	15.90	12.69
Carnarvon	345	214	306	.84	.89	35.36	22.84
Eyre	10,089	13,034	8,845	1.18	.88	18.84	11.17
Fergusson	12,298	12,954	14,993	1.35	1.22	21.80	17.09
Gawler	36,506	40,308	51,688	1.59	1.42	21.66	13.45
Hindmarsh	8,330	8,932	10,030	1.24	1.20	31.56	22.18
Light	45,800	57,846	69,109	1.55	1.51	25.80	15.73
Sturt	14,077	11,737	11,623	1.04	.83	22.01	13.08
Total.....	185,550	221,208	243,259	1.46	1.31	24.21	16.16
Increase ..	34,510	—	22,051	—	—	—	—
Decrease..	—	—	—	—	.15	—	8.05
II. LOWER NORTH—							
Burra	4,526	6,208	4,579	1.35	1.01	17.99	11.77
Daly	25,997	28,386	30,379	1.36	1.17	20.66	13.99
Hamley	658	729	342	.91	.52	16.08	11.98
Kimberley	2,422	2,426	1,458	1.13	.60	17.83	10.70
Stanley	31,911	39,528	46,230	1.59	1.45	25.19	16.93
Victoria	38,660	49,322	52,037	1.63	1.35	24.20	15.34
Young	375	734	233	1.25	.62	16.18	10.98
Total.....	104,549	127,333	135,258	1.51	1.29	19.74	13.10
Increase ..	20,359	—	7,925	—	—	—	—
Decrease..	—	—	—	—	.22	—	6.64
III. UPPER NORTH—							
Blachford	405	957	96	1.00	.24	15.64	8.31
Dalhousie	17,694	23,867	18,970	1.32	1.07	19.13	10.35
Derby	—	—	—	—	—	9.68	8.32
Frome	18,887	25,362	17,977	1.48	.95	22.81	11.68
Granville	858	1,708	343	1.09	.40	15.48	9.78
Hanson	567	3,634	211	1.06	.37	14.13	10.29
Herbert	981	1,127	1,054	1.24	1.07	14.04	10.18
Lytton	20	98	20	.97	1.00	10.44	8.78
Newcastle	3,475	4,607	1,583	1.30	.46	16.03	8.19
Taunton	50	401	30	1.84	.60	13.78	10.11
Total.....	42,937	61,761	40,284	1.34	.94	15.12	9.60
Increase ..	—	—	—	—	—	—	—
Decrease..	2,985	—	21,477	—	.40	—	5.52

WHEAT FOR HAY—continued.

Division and County.	Area Sown.	Produce.		Average Yield per Acre.		Rainfall (Approximate Mean).	
		1911-12.	1910-11.	1910-11.	1911-12.	1910.	1911
	Acres.	Tons.	Tons.	Tons.	Tons.	In.	In.
IV. SOUTH-EASTERN							
Buccleuch	3,020	1,797	1,649	·88	·55	19·10	13·53
Buckingham ...	2,778	1,251	2,353	·86	·85	21·54	15·96
Cardwell	187	143	86	·72	·46	20·91	16·92
Chandos	12,094	15,655	8,791	1·36	·73	19·27	14·08
Grey	1,444	2,498	1,863	1·31	1·29	39·15	28·71
MacDonnell	1,173	520	1,127	·89	·96	28·43	31·08
Robe	1,477	929	1,567	·80	1·06	31·76	22·89
Russell	3,043	2,221	1,931	·86	·63	20·47	11·27
Total.....	25,146	25,014	19,367	1·16	·77	25·08	19·31
Increase ..	3,658	—	—	—	—	—	—
Decrease...	—	—	5,647	—	·39	—	5·77
V. WESTERN—							
Buxton	213	65	127	1·08	·60	—	—
Dufferin	785	474	697	·73	·89	13·80	13·35
Flinders	8,687	8,349	8,874	·83	1·02	27·79	19·24
Hopetoun.....	1,029	461	884	·56	·86	10·99	11·92
Jervois	15,501	8,807	13,370	·95	·86	15·70	12·86
Kintore.....	2,028	712	1,358	·51	·67	10·56	11·68
Le Huite	180	102	132	·76	·73	15·34	13·00
Manchester	65	61	16	·61	·25	15·30	6·74
Musgrave	4,367	3,511	3,899	·91	·89	20·19	17·34
Robinson	4,850	3,785	4,382	·90	·90	18·10	15·36
Way	5,689	2,381	3,796	·73	·67	12·72	11·37
York	72	24	79	1·60	1·10	17·34	11·02
Total.....	43,466	28,732	37,614	·85	·87	16·17	13·08
Increase ..	9,667	—	8,882	—	·02	—	—
Decrease...	—	—	—	—	—	—	3·09
SUMMARY.							
I. CENTRAL	185,550	221,208	243,259	1·46	1·31	24·21	16·16
II. LOWER NORTH	104,549	127,333	135,258	1·51	1·29	19·74	13·10
III. UPPER NORTH	42,937	61,761	40,284	1·34	·94	15·12	9·60
IV. SOUTH-EASTERN	25,146	25,014	19,367	1·16	·77	25·08	19·31
V. WESTERN.....	43,466	28,732	37,614	·85	·87	16·17	13·08
GRAND TOTAL	401,648	464,048	475,782	1·38	1·18	20·06	14·25
Increase ..	65,209	—	11,734	—	—	—	—
Decrease...	—	—	—	—	·20	—	5·81

DISEASES OF FARM ANIMALS.

BY OFFICERS OF THE STOCK DEPARTMENT.

(Continued from page 1023.)

CONTAGIOUS DISEASES (HORSE).

Fortunately, owing to the careful administration of the Quarantine and Stock Acts, the Commonwealth is very free from contagious diseases of stock. In South Australia, with the exception of strangles and influenza, there has been no unusual incidence of contagious trouble amongst horses. In other parts of the world horses are liable to become infected with such diseases as glanders, epizootic lymphangitis, suna, dourine, &c. As these diseases do not exist in South Australia there is no need to describe them. Suffice it to say that horses imported from Great Britain are tested with mallein before leaving, and also on arrival in Australia.

Negligence or laxity of quarantine regulations may possibly allow a disease like glanders to be introduced; it therefore behoves the State authorities to keep a watchful eye on quarantine matters. Cases of tuberculosis, actinomycosis, and botriomycosis have been met with in horses, but they are of very rare occurrence. Tuberculosis of the horse is extremely uncommon. A horse may be infected through ingestion of tubercular milk or contaminated fodder. Actinomycosis and botriomycosis generally attacks the scrotal region, producing schirrous cord. Tumours and abscesses of an actinomycotic character have also been met with about the shoulders, withers, and mammary glands.

STRANGLES.

This disease is highly infectious, and is characterised by the existence of fever, inflammation of the upper air passages and lymphatic glands in the region of the jaw and throat, and at times in lymphatic glands and tissues in other parts of the body. It is caused by a specific organism (*streptococcus*) which can be easily found in the pus of the abscess usually present under the jaws.

Although this disease chiefly attacks young horses from two to five years of age, it may infect animals of any age; but youth is certainly one of the predisposing causes. Teething troubles, training, or testing paces at an

early age, too much work, cold, debility, are all predisposing causes, and make young horses more susceptible to the introduction of the germs. The disease is more prevalent in the spring and autumn than in summer or winter.

As a rule strangles is a benign disease, and it runs its course without any serious results; but if the affected horse is neglected, and the environments are bad, the disease may take on a malignant character with numerous complications, such as abscess formations in different parts of the body. The name "strangles" was given to this trouble because of the difficulty in breathing, when the inflammation of the air passages and neighboring tissues and glands is such as to interfere with inspiration and expiration.

Insanitary stables and yards are undoubtedly favorable to the disease taking on a malignant or irregular form. The disease is spread by actual contact with affected animals, and by means of the pus from the abscesses, or the nasal and mouth discharges.

Symptoms.—Horses suffering from the regular form of strangles usually exhibit dullness and signs of fever; they are not inclined to feed, and there may be slight cough and evidence of sore throat. The breathing is hurried, and the pulse and temperature are increased. Later a swelling is observed about the throat, usually between the jaws. This swelling increases in size, and if the disease is running a favorable course the swelling bursts, and there is a copious discharge of pus, and after a few days the animal is all right. In other cases there is a watery discharge from the nostrils, and afterwards a thick dirty-white or yellowish discharge, and in young horses usually this is very profuse.

The throat may become severely affected; the swelling may be extensive, involving a number of glands and structures, and there may be several abscesses. This condition is certainly serious, as death may take place from suffocation or strangulation.

Abscess formation may result in other parts, for instance, the lungs, the glands in the abdomen, the spleen or milt, the liver, the udder, and sometimes there may be dangerous abscesses in the brain or spinal cord.

The symptoms of irregular strangles vary according to the position of the abscesses. When the lungs are affected, symptoms of pneumonia will be observed; and this form is particularly fatal, because of the liability of several abscesses being formed in different parts of the organs or neighboring glands. There is great difficulty in breathing, cough, much exhaustion and prostration. The abdominal form is indicated by symptoms of colic, tenderness when the abdomen is touched, and afterwards peritonitis may supervene, and there may be rupture of one or more structures, and death.

Cases of strangles observed in several districts of the State during the last two or three years were of an irregular nature, and quite a number of horses were found with the throat very much swollen, the swelling sometimes extending as far as the shoulder. When the abscesses were opened a thick

dirty-looking pus exuded. Cases of strangles abscess in the mammary glands (udder) have also been encountered.

Preventive Measures.—For generations horse-owners had the idea that it was the correct thing to allow strangles to go right through a stable, and when a horse showed symptoms, the owner immediately placed all the remaining horses in contact, so that they would become infected and “be done with it.” This method of dealing with a disease is ridiculous and palpably absurd. During the existence of strangles in a district, great care should be taken that horses do not come in contact with infected ones, or are placed in infected stables, yards, or paddocks. Avoid, if possible, public watering-places; and if horses are taken into towns or cities it is advisable to carry feed and nosebags for them. A strange nosebag is frequently a fruitful source for the spread of disease.

When strangles appears in a farm or stable the affected animals should be immediately isolated, and the remaining horses should be temporarily removed until the premises have been thoroughly cleansed and disinfected. Discharges from infected horses should be destroyed or mixed with disinfectants. Premises are best disinfected with a 4 per cent. solution of formalin and glycerin, and after cleaning and scrubbing, spraying of walls, roofs, and floors will prove very effectual.

Curative Treatment.—Having isolated the affected horses and placed them under suitable hygienic conditions, medicines, such as hyposulphite of soda and saltpetre should be administered in the drinking water. The food should be laxative—bran mash, linseed, and greenfeed. Ammoniacal liniments or Eiliman's embrocation should be applied to throat and swelling under jaw, and sometimes it is necessary to apply a mild blister. Should the abscess not burst of its own accord, owners may lance with a clean knife or lance, and allow free discharge of pus. Keep clean and apply an antiseptic lotion. If symptoms of irregular strangles make their appearance it is advisable to secure the services of a qualified veterinary surgeon.

ANTHRAX.

A few authentic outbreaks of anthrax have occurred amongst horses in South Australia. The fact of anthrax being communicable to human beings lends importance to the disease, and a higher incentive to apply measures for its prevention.

The cause of anthrax is the entrance into the system of the germ of the disease (*Bacillus anthracis*). The germs may gain entrance by means of wounds, by the digestive tract, or by the air passages. In the outbreaks referred to, the germs were undoubtedly introduced in unsterilised bone or blood manures. The horses became affected by ingesting food contaminated with the germs and spores of the disease.

Once anthrax has appeared on a farm the greatest care must be taken, as the germs are liable to remain in the soil, and fresh outbreaks amongst stock may occur at any time.

Symptoms.—In most cases of anthrax there are no premonitory symptoms; the horses die suddenly; tarry blood may be oozing from the natural orifices—the mouth, anus, nostrils, and vagina. In other cases the horses may lose their appetite and show symptoms of colic; the coat is staring, and swellings may be observed, particularly in the region of the jaws. The temperature is high, the pulse rate accelerated, and the breathing quickened. The colic continues, and the pain is intense. The urine and manure may be blood-stained. Cold sweats appear, the horse becomes haggard, groans loudly, and death ends his misery. As a rule, however, symptoms are not present; the farmer discovers one or more dead animals in his stable or paddock.

Preventive Measures.—In all cases of sudden death amongst stock, especially with blood oozing from the natural openings, immediate notification to the nearest inspector of stock should be made. The carcass must not be opened—it should be burned or buried on the spot; and if it has to be removed any distance for purposes of destruction, the natural orifices should be plugged with tow and disinfectant.

Many outbreaks of anthrax have been traced to the indiscriminate disposal of diseased carcasses. The remaining animals should be removed from the infected area, and thorough antiseptic precautions should be adopted. Vaccination as a preventive is now universal, but should only be carried out by officers of the Stock Department.

TETANUS OR LOCKJAW.

This disease continues to destroy a large number of valuable horses every year, and as it is a preventable disease the stockowners should make themselves familiar with it and the measures to be taken for its prevention. The germs gain entrance to an unprotected wound, remain there, and immediately commence forming toxins which get into the general system. Wounds in the feet, thighs, quarters are especially liable to be attacked by the bacilli of lockjaw. It often follows the operations of castration and docking. The germs are found in the soil, and particularly amongst the soil of manure-laden yards and stables.

Symptoms.—In the majority of cases the symptoms are of a very acute character. A stiffness is noticed about the neck and jaw, and the horse's gait is stiff and ungainly. There is difficulty in feeding, and there may be champing and grinding of the teeth. When the owner approaches the affected horse, the animal displays great nervousness and the head is quickly elevated, and he shows the "white" of the eye. Spasms of the muscles are terrible to watch—the stiffness becomes more apparent. He seems set, and when

moved he does so with great difficulty and exhibiting much pain. The tail is held high or straight out. The jaws become very stiff—so close together that it becomes impossible for the owner to get his hand in. The pulse is increased and is wiry and hard.

If the horse is kept quiet he may have moments of quietness, but if he is disturbed the paroxysms of the disease are renewed with increased vigor. Being unable to reach his food unless it is placed in a receptacle high enough for him to reach it, his attempts to obtain his food are awful to witness.

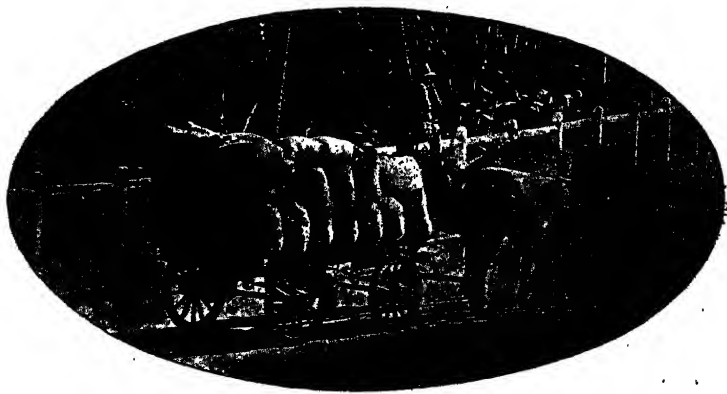
In a few instances lockjaw may be of a mild type, the jaw may only be partially locked, and the other symptoms not so severe.

Preventive Measures.—Sanitation of stables and yards should certainly be attended to, and stockowners should not allow manure to accumulate in those places. All wounds—even slight ones—should be cleansed and dressed with antiseptics, *e.g.*, carbolic lotion. Punctured wounds in the feet should receive special attention, and care should be taken to adopt cleanly and antiseptic measures during the operation of castration.

Curative Treatment.—If a veterinary surgeon is within reach, the owner should immediately secure his expert opinion. The horse should be put in a dark loosebox. It is preferable that only one attendant should look after him, and he must exercise great care in entering and leaving the box. The box should be bedded with some soft material, such as tan or seaweed, so as not to disturb the animal.

A food receptacle should be placed in a high position so that the horse can reach it, and the feed should consist of sloppy bran and linseed mash.

If a wound can be discovered—and it should always be looked for—it is advisable to scarify it and apply a strong antiseptic. Belladonna has been found a very useful drug in cases of tetanus, and can be administered in the form of an electuary on the tongue, or at sides of mouth, by means of a wooden spoon or knife. Anti-tetanic serum has been found serviceable in sub-acute cases of lockjaw, but with indifferent success in acute cases.



POULTRY NOTES.

By D. F. LAURIE, Poultry Expert and Lecturer.

OPERATIONS FOR JUNE.

DRY SEASONS.

At the time of writing the agriculturists of this State are anxiously hoping for the long delayed rain. In former years, when droughty conditions prevailed, a great many farmers found that the returns from eggs and poultry realised sufficient to pay all the household expenses, and very often there was a surplus to credit. Those were the days of low prices for eggs and table birds. The average price of eggs has advanced over 50 per cent., and the average price of table poultry has more than doubled since then. Although fowls lay better when there is an ample supply of green grass, &c., on the farms, the fact remains that poultry production is quite independent of rainfall.

We have the finest country in the world for poultry-breeding, and our markets are unlimited. The merchants could deal with ten times the quantity at present available, and prices would tend to improve rather than otherwise. Years of prosperity have made many farmers careless of what they call trifles; although our trifles of eggs and poultry aggregate an annual value of £650,000, with £150,000 worth sent to the other States.

As I have often remarked in country lectures, when the French nation paid, with ease, the huge war indemnity, it was not the big farmer, squatter, and landowner who found the money; it was the numerous thrifty small farmers with their flocks of poultry, a cow or two, and other so-called trifles.

If more attention were paid to poultry-breeding, so that our exports would be a million sterling annually, we should not dread the lean years as now, when it is a question of the growth of vegetation or ruin.

POINTS TO REMEMBER.

Include poultry-breeding in your scheme of work. Breed only the most profitable kinds. If you are distant from the markets, egg production will be the most profitable. If you are close (say, within 100 miles) to markets, keep such fowls as will lay well and provide good table chickens. Breed turkeys, if you are close to market; in addition, you should breed ducks, as there is a profitable market for good large ducklings.

House your birds properly. Misguided persons have inflicted upon Australia the awful curse of the fox, which is destroying our native birds and rendering poultry-keeping more difficult. You must have secure fox-proof yards and houses. Fowls need proper housing if they are to lay well. Some people may differ; but I say that good housing is the chief point in poultry-keeping; and this is my experience after nearly 40 years of close study of the question. Every breeder of note, in all parts of the world, is now coming to this conclusion. Erect sanitary houses, dry and well ventilated, but free from draughts. Keep the houses clean and free from vermin.

Feed your birds intelligently. If you buy up the cheap sweepings, salt water damaged grain, and refuse generally, you cannot expect any eggs nor fat birds. You can confidently anticipate the loss of a good many birds and, at the same time, cash. No one can plead ignorance, because the Government has placed facilities available for any and every inquirer—such facilities are the envy of many people in other lands, who would be most thankful for the help. Next to housing, the question of proper foods and methods of feeding ranks in importance. If you are in doubt on this question write for information.

Deliver your eggs to the merchants at least once a week in winter and twice a week in summer. Keep unmated hens for market egg production. The infertile eggs keep longer, and you do not have to feed male birds which do not lay. Keep only selected hens and male birds for breeding. If you have not done so in former years, make a fresh start this year, and breed only from good layers. Remember, the hen which lays only in the spring will breed your pullets with the same worthless characters. If your stock is indifferent, obtain sittings of eggs from a reliable breeder or from the Government Poultry Stations at Roseworthy, Kybybolite, or Murray Bridge. The leading breeders of laying fowls have pens entered in the laying competitions. You can read their names in the newspapers each week or in the *Journal of Agriculture*. You will get what you require from these breeders. Remember, however, that the eggs of carefully-bred layers are worth much more money than are the eggs of common fowls.

LECTURES AT THE SCHOOL OF MINES.

Suburban breeders are notified that lectures on aviculture will be resumed at the School of Mines, Adelaide, on June 14th. There are some hundreds of breeders close to Adelaide who often during the year call at my office in search of information. I am always glad to welcome them, but will welcome them the more heartily at the lectures, when I can as easily explain the system to a hundred as to one. Do not delude yourself by saying that you know all about it, because you do not. A recent arrival in the State was anxious to embark in poultry-breeding. His experience was that he had kept about 50 fowls in England—a country notorious for its backwardness in utility

poultry-breeding. He proposed taking a course at Roseworthy Poultry Station, but, after a few hours' inspection, stated that he "Knew all about it now." And yet one of the best known poultry-breeders in the old country said he would like to spend a season at Roseworthy to learn the methods in force.

INCUBATORS.

Carry out carefully the instructions sent out by the maker of the machine. If you do so, and buy a good class of incubator, you will find hatching chickens and ducklings a simple matter, provided the eggs are laid by healthy well-fed stock birds.

After every hatch you should clean and scald the burner of the lamp and fit a new wick, so that a clear bright flame will result and give you constant heat. Scrub the drawer and disinfect it with a solution of formalin 10 parts, water 90 parts. Paint the inside of the egg chamber with the formalin solution. If you have no formalin, spray the egg chamber and egg tray with water, and then place a teaspoonful of sulphur in a small tin in the egg tray and drop some live coals on the sulphur and close the drawers. The sulphurous acid vapor will destroy germs. This disinfection after each hatch is very important.

SIZE OF EGGS.

Merchants complain that there are still far too many small eggs sent to market; therefore, do not breed from hens which lay small eggs. See that the male bird in your breeding-pen is from a hen which laid good-sized eggs. Do not attempt to hatch an egg just because it may produce a young bird. Select an egg laid by a bird of which you would like to have more specimens. Let your aim be to hatch a smaller number of first-class birds, rather than a greater number, most of which will be inferior specimens.

LUCERNE.

A great demand for lucerne hay chaff is springing up. Every poultry-breeder should grow a plot for green feed. Those who have the land to spare should grow acres of it. There is money in lucerne hay chaff; the other breeders will gladly buy any you may be able to spare. Get the ground ready and work it well before spring.

HAVE YOU

Built scratching-sheds for your fowls, and have you laid concrete floors upon which to place loose sardy soil and plenty of straw?

Prepared a supply of chicken feed of various grades for newly-hatched and for older chicks?

Scalded, scrubbed, and disinfected, and repaired your brooders?

Tightened up your wire netting, repaired holes, &c., oiled the hinges of doors and gates, and fixed the latches and locks?

Adopted the system of frequently cleaning your fowlhouses and destroying vermin?

Eradicated all poultry ticks, or, in the alternative, do you wish a closer acquaintance with an inspector?

Secured the incubator and brooder you require, also the earthenware food and water dishes?

Erected some single pens, so that you may test, during the next 12 months, the laying capacity of your pullets?

Informed all your poultry-breeding friends that for the sum of 1s. a year the *Journal of Agriculture*, containing monthly poultry notes, the monthly report of the laying competitions, and other valuable information, will be posted to them?

Adopted the wise plan of handling and examining each bird at least once a fortnight to ascertain its condition, and to look for vermin or for early signs of disease?



NOTES ON EGG-LAYING COMPETITIONS.

STATIONS ROSEWORTHY AND KYBYBOLITE.

As anticipated, many of the too forward birds moulted and ceased laying. On the whole the results to date are satisfactory. The peculiar and unseasonable weather experienced has had its effect at the poultry stations, just as it has generally throughout the State, as evidenced by the scarcity of eggs and high prices. These tests should open the eyes of those farmers who do not pay proper attention to poultry. Drought has not affected them, nor are any losses due thereto. On the contrary the egg production, although not heavy, has been most profitable, and many a farmer, had he a hundred or so good hens of similar quality, would have been glad of the monthly cheque for eggs.

ROSEWORTHY.

The Superintendent reports—The birds are all in good health and well advanced through a general light moult. Laying has continued on moderate lines. I had hoped for an increase in totals before this, but, owing to the moult, heavier laying has been restrained, and from appearances nothing sensational is likely to occur until after June. The size of the eggs is increasing, about 50 per cent. being over the 2oz. grade. The weather has been fine and moderate during the month, the average maximum at 9 a.m. being 75.5°, and the average minimum 44.2°. The highest reading recorded was 90.8°, while the lowest was 34.1°. Two frosts were recorded but no rain. Two deaths were recorded during the month, viz., one White Leghorn hen through accident, and one from well-developed roup. One hen was also replaced on account of sickness. Six Black Orpingtons have been transferred to the broody pen.

KYBYBOLITE.

The Superintendent Kybybolite Poultry Station reports—The general health has been good and no deaths have been recorded. In Section I. we still have 15 birds in a backward condition, though all the pens have started to lay. Owing to a few birds being too forward at the commencement of the competition five have started to moult. In Section II. 19 birds were backward on May 1st; this leaves 23 birds in a laying condition. In this section two birds had to be removed for broodiness during the month. The laying has still improved, and compares favorably with that of last year for May. The leading pen for April has fallen back one, and pen No. 21, owned by Mr. Lacey, a local breeder, has taken up the running. The weather has been mild and dry for May, up to the 24th only 49 points of rain had fallen, and this extended over a period of five days. The days have been warm but with very cold nights. Six frosts were recorded. The maximum temperature was 77° and the minimum 30°.

D. F. LAURIE, Poultry Expert and Lecturer.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started April 1st, 1912, and to terminate March 31st, 1913.]

Competitor.	Eggs Laid for Month ended May 31st.	Total Eggs Laid from April 1st, 1912, to May 31st.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS.

Cowan Bros., Burwood, N.S.W.	122	168
Tabuteau, J. O., Black Rock, Melbourne	63	132
Hodges, H., Pyralong, Victoria	60	78
The Range Poultry Farm, Toowoomba, Queensland	81	119
Brundett, S., Moonee Ponds, Victoria	79	125
Jessup, W. C., Caulfield, Victoria	114	135
Dawes, J. H., Granville, Sydney	107	175
Beadnall Bros., Gawler	113	190
Redfern Poultry Farm, Caulfield, Victoria	17	37
Kerr, R., Longwood, S.A.	74	176
Eckermann, W. P., Eudunda	85	125
McNab, J. A., Sandringham, Victoria	81	145
Mazey, P., Alberton	49	53
Broderick, P. J., Gawler	55	56
Redfern Poultry Farm, Caulfield, Victoria	68	128
Braund, J. E. and H. J., Islington	54	70
Dunn, L. F., Keswick	76	124
Hocking, E. D., Kadina	81	129
Groom, E., Peterhead	85	142
Pope, R. W., Heidelberg, Victoria	102	191
Haimes, T. F., Fullarton Estate	65	71
Provis, W., Eudunda	75	107
Burton, W. S., Moonta Mines	60	125
Broster, G., Mallala	73	77
Brain, J. H., South Yan Yean, Victoria	87	174
Sargent's Poultry Yards, East Payneham	128	202
McKenzie, H., Northcote, Victoria	84	139
McDonnell, J., Greytown, Rosewater	119	176
Browne, A. R., Hawke's Bay, N.Z.	108	147
Brain, J. H., South Yan Yean, Victoria	32	32
Marsson, C., Welland	37	41
Hutton, C., Parkside	59	90
Miels, C. & H., Littlehampton	49	49
Moritz Bros., Kalangadoo	88	170
Codling H., Mitcham Park	71	89
Troughbridge Poultry Yards, Edithburg, Y.P.	50	54
Irvine, A. W., Epsom, Auckland, N.Z.	76	117
Walker, P., Hicksborough, Victoria	67	125
Lampe, B., Kadina	18	35
Waite, F. J. O., Nailsworth	83	150

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended May 31st.	Total Eggs Laid from April 1st, 1912, to May 31st.
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SECTION I.—LIGHT BREEDS—*Continued.*

WHITE LEGHORNS.

Badeock, G., Mile End	37	66
McClelland, A., Mordialloc, Victoria	43	61
Tomlinson, W., Clarence Park	62	88
Roberts, L. L., Kadina	71	118
"Strathcona," Long Plain	73	91
Whitegate Poultry Farm, Deepdene, Victoria	85	108
Purvis, Miss Gracie, Glanville	79	155
Padman, A. H., Hyde Park	74	181
Sickert, P., Clarence Park	84	132
Purvis, W., Glanville	63	112
Rice, J. E., Cottonville	99	169
Hamill, H., Kogarah Bay, Sydney	51	75
Gurr, W. E., Kapunda	61	79
McLeish, E., North Adelaide	50	58
Craig Bros., Hackney	61	84
Uren, Mrs. P. A., Kapunda	116	236
Perry, Wm., Murrumbidgee, Victoria	75	109
Nancarrow, J. T., Port Adelaide	50	78
Bertelsmeier, C. B., Clare	76	149
Tockington Park Poultry Farm, Grange	74	144
Trenwith, T. H., Kadina	37	58
Knappstein & Bray, Clare	30	39
Whitegate Poultry Farm, No. 2, Deepdene, Victoria	49	82
"Denehollow," Caulfield, Victoria	65	67
Hill, Chas., Monarto South	44	49
"Islay," East Malvern, Victoria	39	77
Cosh, A. J., Burnside	92	119
Indra Poultry Farm, Freeling	63	76
Whitrow, A. J., Knoxville	79	132
Hall, T. O., Rose Park	69	91
Ontario Poultry Farm, Clarendon	81	132
Howlett, H., Moonta	81	108
"Koonoowarra," Enfield	90	159
Hall, A. W., South Oakleigh, Victoria	92	184
Convent of the Good Shepherd, Oakleigh, Victoria	54	60
Carne, E. A., Kangaroo Flat, Victoria	72	118
Navan Poultry Farm, Minlaton	45	84
Lillywhite, R. G., Fullarton	68	129
Gibbs & Pine, Queenstown	9	10
Hughes, J. J., Elsternwick, Victoria	1	1
Shamrock Poultry Farm, Perth, W.A.	45	92
Bertelsmeier, C. B., Clare	27	57
Nancarrow, J. T., Port Adelaide	65	100

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

Robertson, F. H., Northam, W.A.	41	57
McKenzie, E., Northcote, Victoria	39	80
Mitchell, B., Bendigo, Victoria	9	40
Provis, W., Endunra	8	72
Kenway, D., West Pennant Hills, Sydney	46	59
Cowan Bros., Burwood, N.S.W.	42	86
Kenmore Poultry Farm, Dandenong, Victoria	5	38
Brundett, S., Moonee Ponds, Victoria	25	53
Gant, E. V., Richmond	33	74

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended May 31st.	Total Eggs Laid from April 1st, 1912, to May 31st, 1912.
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SECTION II.—HEAVY BREEDS—Continued.

BLACK ORPINGTONS—Continued.

Dyer, P. R., Woodville	10	18
Lampe, B., Kadina	28	37
Wirraparinga Poultry Yards, Plympton	23	49
Phillips, A., Portland, S.A.	8	8
Martin, B. P., Unley Park	50	110
Nancarrow, J. T., Port Adelaide	—	—
Padman, J. E., Plympton	97	142
Francis Bros., Fullarton	—	5
Hall, T. C., Rose Park	40	93
Tockington Park Poultry Farm, Grange	15	24
Bertelsmeier, C. B., Clare	46	81
Craig Bros., Hackney	42	119
Bertelsmeier, C. B., Clare	29	74

SILVER WYANDOTTES.

Dunn, L. F., Keswick	57	102
Tidswell, H. J., Mitcham Park	75	163
Moyses, S., Blyth	44	103
Perry, Wm., Murrumbena, Victoria	12	12
"Deneshollow," Caulfield, Victoria	41	70
Western, F. C., Marion	73	114

SALMON FAVEROLLES.

Courtenay, K., Mordialloc, Victoria	73	142
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LANGSHANS.

Stevens, E. F., Littlehampton	66	96
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PLYMOUTH ROCKS.

"Koonoowarra," Enfield	24	24
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SECTION III.—SCRATCHING SHED SECTION.

WHITE LEGHORNS.

Sickert, P., Clarence Park	92	127
Tomlinson, W., Clarence Park	78	171
Monitz Bros., Kalangadoo	81	130
Codling, H., Mitcham Park	71	112
Sargenfri Poultry Yards, East Payneham	71	101
Purvis, W., Glanville	55	126
Bertelsmeier, C. B., Clare	67	131
Padman, A. H., Hyde Park	87	163
Hocking, E. D., Kadina	58	98
Beadnall Bros., Gawler	40	43
Brain, J. H., South Yan Yean, Victoria	29	61
Provis, W., Eudunda	67	136
Redfern Poultry Farm, Caulfield, Victoria	76	145
Broderick, P. J., Gawler	13	13
"Koonoowarra," Enfield	27	35
Lillywhite, R. G., Fullarton	38	103
Cosh, A. J., Burnside	51	94
Indra Poultry Farm, Freeling	45	110
Whitrow, A. J., Knoxville	49	85
Tockington Park Poultry Farm, Grange	62	140

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended May 31st, 1912.	Total Eggs Laid from April 1st, 1912, to May 31st, 1912.
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SECTION I.—LIGHT BREEDS.**WHITE LEGHORNS (except where otherwise notified).**

Gleneig River Poultry Farm, Mount Gambier	121	157
Dow, A., Glencoe West	97	147
McNamara, Mrs., Mount Gambier	71	104
Moritz Bros., Kalangadoo	113	216
"Mahama," Mount Gambier	71	96
Holmes, F. A., Frances	96	136
Sudholz, A., Kalangadoo	45	51
Staunton, S., Naracoorte	86	103
Hall, C. W., Mount Gambier	97	114
Moritz Bros., Kalangadoo	100	188
Vorwerk, K. E., Millicent	70	77
Vorwerk, H. F. & A. C., Millicent	86	132
Jarrad, J., Mount Gambier	64	64
Bartram, T. A., Kybybolite	117	155
Vorwerk, H. F. & A. C., Millicent	87	110
Jenkins, R. D., Kybybolite	32	62
Arthur, J. S., Bordertown	96	140
Diake, C., Naracoorte	93	104
"Eurinima," Kybybolite	101	123
Smith, M., Hynam	51	90
Lacey, F. C., Kybybolite	142	219
"Herdfield," Mount Gambier	129	173
Blue Lake Poultry Farm, Mount Gambier	50	61
Beaton, W. J., Tantanoola	62	105
Bennett, E., Kalangadoo	17	37
Jones, H. F., Mount Gambier	40	40

MINORCAS.

James, S. T., Mount Gambier	11	23
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SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

"Herdfield," Mount Gambier	28	32
Blue Lake Poultry Farm, Mount Gambier	39	60
McNamara, Mrs., Mount Gambier	38	44

SILVER WYANDOTTES.

Moritz Bros., Kalangadoo	49	123
Osborne, W. F., Kalangadoo	57	78

PLYMOUTH ROCKS.

Bishop, B., Mount Gambier	—	—
Gleneig River Poultry Farm, Mount Gambier	20	30

D. F. LAURIE, Poultry Expert.

ROSEWORTHY AGRICULTURAL COLLEGE.

WHEATEN HAY: INVESTIGATIONS AS TO WHAT STAGE OF DEVELOPMENT TO CUT TO BEST ADVANTAGE.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College ;
J. H. PHILLIPS, B.Sc., State Agricultural Chemist ; W. J. SPAFFORD,
Assistant Experimentalist ; and N. S. MAY, Assistant Analyst.

INTRODUCTORY.

Cereal hay—and at that chiefly wheaten hay—is the main, and frequently the only, artificial foodstuff fed to horses in Australia. To a less degree it finds its way at certain times of the year into our cow byres and cattle sheds, and more rarely still, in the shape of chaff, into the feeding troughs of sheep paddocks. On Australian farms feeding operations, as understood in other countries, are admittedly very limited ; indeed, it may be stated to be the aim of our every-day practice to avoid them wherever possible. When, on the other hand, special circumstances impose on us artificial feeding in some form or other, it is perhaps true that we are inclined to lean over heavily on this, our only stored-up forage crop. Hence, in the light of modern feeding principles, it follows that we do not extract from our wheaten hay the utmost farthing of its value, and that our feeding practice, such as it is, is to that extent inclined to be wasteful. There are many who carp at this more or less indiscriminate use of wheaten hay ; there are none, however, who can gainsay its great intrinsic value as a food stuff ; experience extending over 50 to 60 years may be said to have placed this beyond the region of reasonable criticism. It is a well-established fact that draught horses will carry out efficiently the heaviest of slow work on wheaten hay alone ; and corn—in the form of oats or barley—is an unknown quantity in the rations of many of our farms. It is not our intention in the present article to discuss the possible value, under normal Australian conditions, of alternative and more scientifically varied feeding rations. This much, however, may be said : Had not our pioneers discovered at an early date that under climatic conditions such as ours the wheatfield must support itself by providing the fuel that sets going tillage and harvesting machinery, it is difficult to realise how wheat-growing could ever have succeeded in spreading over the comparatively arid portions of the continent.

Australia, we believe, is the first country to have made current use of immature wheat for forage purposes ; and, so far as we are aware, it is still

the only country adhering extensively to the practice. This fact it owes mainly to its "newness" in the comity of agricultural communities and its consequent freedom from the shackles of traditional prejudice. In the older settled countries wheat has come so much to be looked upon as the special perquisite of man that traditional lore has imposed upon it a semi-sacred character, and to cut down a promising wheat crop for the sole benefit of the beasts of the field that perish would be regarded in the light of a mild form of sacrilege. Hence it follows that everything pertaining to the handling of wheaten hay, the cutting stage, the curing process, the stacking and keeping, the feeding, &c., Australian farmers have had to acquire from practically unaided local experience. Nor can it be said that this local experience has as yet become so definitely and rigidly crystallised as to preclude the possibility of improvements or variations on existing practices. Hence it has occurred to us that a series of systematic investigations into some of the questions affecting the making of wheaten hay, as it is practised in South Australia, would not be without value.

The scope of the present article is limited to questions affecting the stage of development of the wheat crop most suitable to the making of hay. Incidentally, too, attention will be drawn to various questions relating to the growth and the ripening of the wheat crop itself.

The experiments upon which the various data and conclusions are based were conducted on the Roseworthy Agricultural College Farm during the course of the 1911-12 season.

THE CUTTING STAGE OF HAY.

With many forms of hay, such as lucerne hay, clover hay, &c., it is a very general practice to mow down the crop towards the period of full bloom; a custom derived, no doubt, from the experience of centuries of haymaking. It has sometimes, however, been sought to justify this practice on purely theoretical grounds. Thus, it has been urged that when in full bloom the plant must be at its maximum of even development; that at this stage stems, leaves, and flower heads are all equally well stocked with digestible food material, and therefore all nourishing to an equal degree; but that later on, as seeds begin to develop, they succeed in drawing to themselves the great bulk of the food reserves of the plant, and to that extent bring about an appreciable reduction in the feed value of the stems and leaves. Views of this kind are usually taken to represent the theoretical basis justifying the practice of mowing down hay at full bloom.

On the other hand, when practice decrees that hay shall be cut at this early stage, it appears to us that it has quite as much an eye upon succeeding cuts and grazing aftermaths as upon the actual quality of the hay cut. It is fairly certain that in the great majority of cases later cuts would result in heavier individual hay yields than cuts at full bloom. Further, since the

elaboration of organic matter by the plant is exceedingly active between full bloom and the ripening of the seed, both the proportion and the total quantity of organic matter present must be much greater in later cuts than at full bloom time. In the same way there arises a corresponding decrease in the proportions of mineral matter present in the hay of later cuts, which, as a foodstuff is greatly to its advantage. The scouring action on livestock of young immature grass is well known to all livestock owners, and must be attributed very largely to the exaggerated proportion of mineral matter in immature plant growth. A similar phenomenon is brought home to those who indulge in the consumption of unripe fruit. We may infer, therefore, that immature cuts of hay are not necessarily more nourishing than those cut in more advanced stages of development; and when we find them adopted at all widely by general practice it is probably for mixed reasons that we are not always able to appreciate.

Lastly, particularly where some forms of gramineous hay are concerned, plants in an advanced stage of development are apt to become hard and fibrous, and as such, not only less acceptable to livestock, but also less digestible, and therefore of impaired value as a foodstuff. Wherever this proves to be the case it is evident that this lack of digestibility of the hay must be forestalled by comparatively early cutting.

We shall now endeavor to ascertain the various points that appear to govern the cutting of wheaten hay in this State. In the first place we may note that when the South Australian farmer sets about cutting his wheaten hay he is hampered by no afterthoughts of a second cut, or even of a grazing aftermath; for in the great majority of cases these are unknown things under our conditions of climate. And it follows that to make the most of the only cut possible is the sole object of the South Australian haymaker. For the present, local practice decrees that wheaten hay shall be cut some time after bloom, when the grain is towards the end of the milky stage, or even in the early soft dough stage. On the other hand, for hay buyers, color is usually the standard of quality; in their view good hay must be of a good green color, a sure indication of both proper cutting and curing, and show a normal proportion of shrivelled grain. It is to be feared, however, that much of the hay cut in South Australia does not comply with these two simple tests of quality. It is true there is rarely, if ever, reason to complain of "unripeness" in our average hay. Fully developed grain, on the other hand, is very far from exceptional in much of the hay cut towards the end of the season; so much so, indeed, that it has been whispered that at times chaff merchants have been able to combine the selling of wheat with their more ostensible calling.

In many of our districts wheat is grown far more extensively for hay than for grain, and where this is the case far more hay is disposed of by sale than is reserved for home consumption; and, doubtless, in these districts the hay-grower will show a natural tendency to mow his hay at that stage from

which experience has taught him to expect the heaviest yields, independently, perhaps, of quality. In this connection he knows well that early-cut hay, however bulky in appearance, is apt to dry out light and trashy; and as such, independently altogether of its possible feeding value, it is not in the hay-grower's view deemed profitable. This fact, we think, will account for much of the overripe hay to be met with in South Australia—often fitter, in our view, for the stripper than for the haystack. In extreme cases the culms and flag are little better than so much straw, whilst the abundance of fully-developed grain in the hay is a standing menace to the digestive organs of our horses. One of the first points that we shall consider, therefore, will have reference to the stage of development in the crop which may be expected to yield the heaviest crop of hay, without sinking altogether indispensable quality.

INFLUENCE ON YIELDS OF STAGE OF GROWTH OF HAY CROP.

In the 1911-12 season we picked out in the field as even a patch of King's White wheat as we could find. From this field, at intervals of a week or thereabouts, we cut out seven successive cuts of hay, starting at bloom time and ending up with the maturity of the grain. The area cut in each instance was 1/100 of an acre; too small an area, it is true, to determine exact acre yields, nevertheless sufficiently large for the purposes we had in view, since all the plots admit of strict comparison one with the other. In each case the green crop was weighed as soon as cut and put to dry in the usual way; once dried the hay was weighed again and taken to the laboratory for analysis.

In Table I. are shown the results of these weighings, together with the calculated yields of hay to the acre. The latter figures are given, not because their strict accuracy can be guaranteed, but because in such matters they represent a mode of expression with which everybody is familiar; and, at all events, if not strictly accurate, they may be taken to be sufficiently so for purposes of general comparison.

TABLE I.—*Showing Green and Dry Weights of Hay Cut at Various Stages of Growth.*

Sample.	When Cut.	Remarks.	Weight from 1/100 of an Acre.		Hay Yield per Acre.	Loss of Moisture. % on Drying.	
			Green.	Dry.			
			lbs.	lbs.	T. C. Lb.		
A.....	Sep. 22	Full bloom	150.50	58.36	2 12 2		61.22
B.....	" 30	Grain just formed	180.50	73.74	3 5 94		59.15
C.....	Oct 6	Grain full size; milky	147.75	69.07	3 1 75		53.25
D.....	" 15	Grain leaving milky stage; most flag dry	152.00	76.89	3 8 73		49.41
E.....	" 21	Grain just in dough stage; all flag dry	143.75	78.42	3 10 2		45.45
F.....	" 28	Grain full and plump, but still soft; straw pale gold	97.50	65.65	2 18 69		32.67
G.....	Nov 4	Grain leaving dough stage, but not quite dry	73.50	60.45	2 13 109		17.76

It should be stated from the outset that the second cut of hay, represented by sample B, appears to be abnormal, for reasons that have unfortunately escaped us. If we except this sample, we shall note in Table I. that in the hay cut there is a progressive rise in yields from the cut made at full bloom to that made when the grain was frankly in the dough stage and the flag quite dry. Subsequent cuts, however, showed a gradual decline in yields as the more or less complete ripening of the grain was approached; the cause of this decline we shall have occasion to consider later on. This steady rise in the hay yields, followed by an equally steady decline, is well illustrated graphically in Fig. 1.

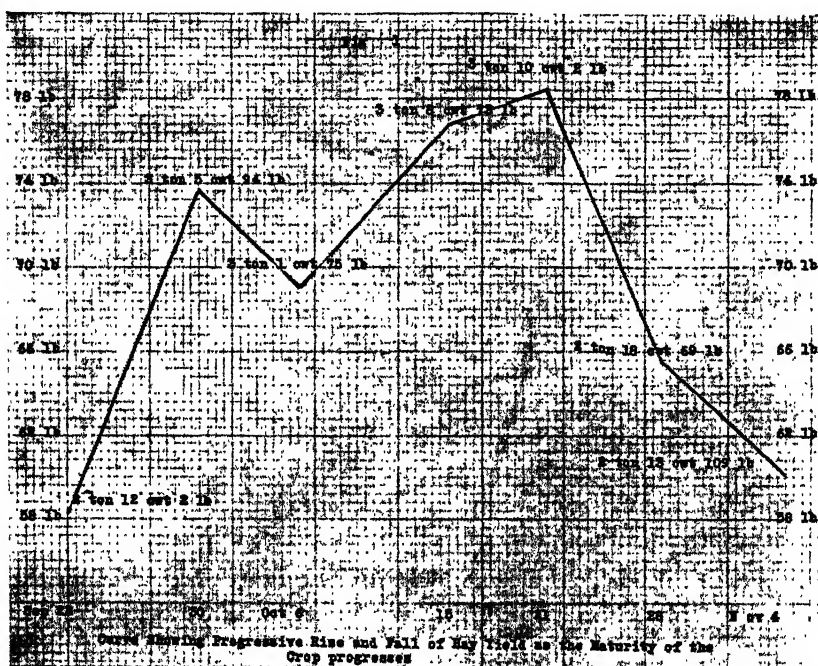


Fig. 1.

It should be noted, too, that the loss of weight on drying is far greater in the earlier than in the later stages of development. This fact is brought out very clearly in the last column of Table I. Whilst at full bloom the loss of weight on drying was represented by close on two-thirds of the green weight, the loss was less than one-fifth in the last cut, when the grain was practically ripe. This point will be dealt with at greater length further on.

It should be stated that the figures in the second and third columns of Table I., representing the dry hay weights cut, have all been calculated to an uniform moisture content of 15 per cent., which represents, roughly,

the moisture content of average new hay ready for the stack. We were compelled to have recourse to this method of expressing the dry weights, because of the difficulty experienced in drying uniformly relatively small quantities of hay under varying atmospheric conditions. In our actual field tests the earlier cuts retained, when weighed, too great a percentage of moisture, because of the prevalence at the time of showery conditions and overcast skies; whilst under the influence of the blazing sun the small stocks of the later cuts were, on the whole, too dry. Hence, for the purpose of fair comparison, it was thought best to refer all the dry weights to the average moisture content of 15 per cent.

Before leaving this aspect of the question, we append a few field notes describing the appearance and condition of the successive cuts of hay when sufficiently dry for the stack.

Sample A (cut September 22nd, dry October 6th)—Hay of good green color throughout the culms and flag; ears very much bleached, with no sign of grain.

Sample B (cut September 30th, dry October 16th)—Very nicely-colored hay, green from tip of ears to base of culms; no grain present.

Sample C (cut October 6th, dry October 23rd)—Good sample of hay, green throughout; grain very small and shrivelled.

Sample D (cut October 15th, dry October 30th)—Attractive-looking hay, but inclined to be white and bleached towards the base of the culms; grain about half-size.

Sample E (cut October 21st, dry November 7th)—Rather poor sample of hay, very much bleached; large proportion of fairly well developed grain.

Sample F (cut October 28th, dry November 11th)—Poor sample of dry-looking bleached hay; grain full size and fairly plump.

Sample G (cut November 4th, dry November 20th)—Straw absolutely bleached; grain fine and plump, quite up to ordinary seed requirements.

In conclusion, therefore, it may be stated that the heaviest yield of hay was secured at the fifth cut, when the grain was entering upon the soft dough stage; whilst by the usual commercial standards the best quality hay was yielded by the third and fourth cuts, harvested respectively when the grain was distinctly milky in the first instance, and when it was about to leave the milky stage in the second.

RELATIVE PROPORTIONS IN THE SUCCESSIVE CUTS OF HAY, OF EARS ON THE ONE HAND, AND OF FLAG AND CULMS ON THE OTHER.

We have already pointed out that after the fertilisation of the flowers the plant throws the whole of its energies into the building up of the concentrated seed tissues. This process, which takes place largely at the expense of the other portions of the plant, must have the effect of draining them of

useful foodstuffs represented by digestible organic matter. In the wheat plant, therefore, the development of the ears must be accompanied by a corresponding decline in the culms and flag; hence, it follows that the longer we delay cutting our hay the greater will be the unevenness of distribution of the useful feeding materials, the more concentrated and heavier the ears, and the lighter and the poorer the culms and flag. In order to demonstrate this fact clearly, we submitted each separate cut of hay to the following treatment:—As soon as the hay was judged to be sufficiently dry for the purpose it was weighed in the field and a note taken of the total weight; immediately after this treatment the ears were carefully separated from the culms and weighed separately. The results secured in this manner are summarised below in Table II., in which, as was the case in Table I., all dry weights have been calculated out to uniform moisture contents of 15 per cent.

TABLE II.—*Showing Relative Proportions in Successive Cuts of Hay, of Ears on the one hand, and Culms and Flag on the other.*

Sample.	Total Dry Weight per 1/100 Acre.	Dry Weight of Ears per 1/100 Acre.	Dry Weight of Culms and Flag per 1/100 Acre.	Percentage of Ears in Total Dry Weight.
	Lbs.	Lbs.	Lbs.	%
A.....	58.36	7.82	50.54	13.40
B.....	73.74	10.66	63.08	14.46
C.....	69.07	9.25	59.82	13.39
D.....	76.89	17.09	59.80	22.23
E.....	78.42	22.13	56.29	28.22
F.....	65.65	21.85	43.80	33.28
G.....	60.45	21.87	38.58	36.18

The results summarised in the table above bring out several points to which attention may be drawn.

1. So long as the grain continues in the milky stage, notwithstanding the general increase in the total weight of the plants, the relative proportions between the ears on the one hand, and the culms and flag on the other, remain approximately the same. In our results, during this period, the heads dried to the consistency of hay, represented from 13 per cent. to 14 per cent. of the total weight of the hay. We conclude, therefore, that during this stage of development of the plant the elaboration of organic matter by the green parts of the plant is able to keep pace with the progressive development of the ears, without placing an appreciable strain on the original supplies of the culms and flag.

2. As soon, however, as the grain begins to leave the milky stage, exemplified in sample D, the weight of culms and flag first comes to a standstill, and subsequently declines very perceptibly. This loss of weight increases in importance as the grain approaches complete maturity.

3. This loss of weight in culms and flag is accompanied by corresponding increases on the part of the ears.

4. The increases in weight of the ears, however, come to a standstill once the grain has become frankly doughy. Thereafter, the more complete ripening of the grain is not accompanied by any perceptible increase in the weight of the ears. This fact is clearly brought out in Table II. with reference to samples E, F, and G.

5. Culms and flag continue to lose weight even after the ears cease to make perceptible gains; hence, as maturity advances, a total dead loss in dry matter of the standing crop. This loss is to be attributed partly to the fall of the exhausted flag, partly to the fact that assimilation either comes to a standstill in the economy of the plant, or else is not sufficiently active to

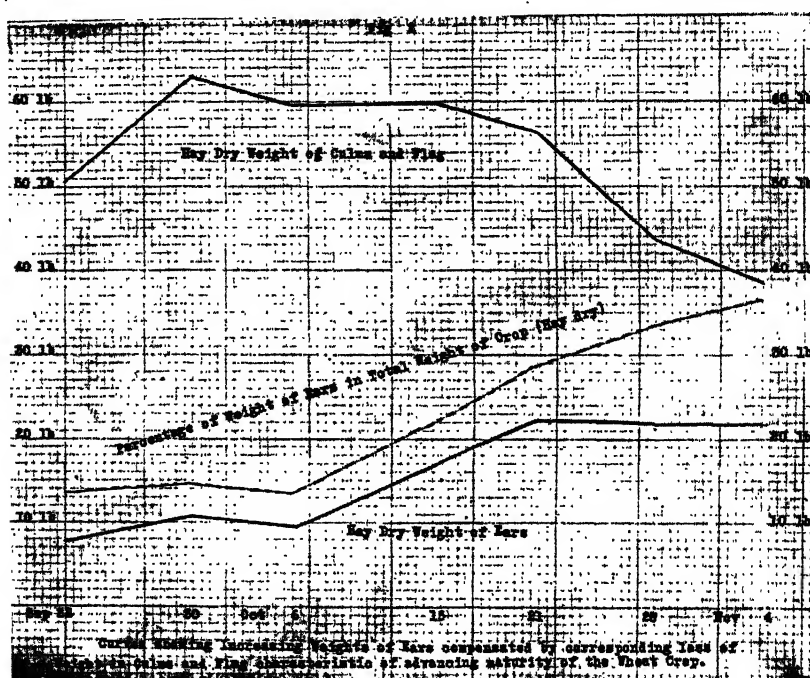


Fig. II.

make good the losses of organic matter that always accompany normal respiration; and partly too, perhaps, as we shall have occasion to see later on, because as maturity approaches, the mineral matter in stems and flag shows a tendency to migrate towards the root system.

We have already had occasion to note that on ordinary commercial standards, samples C and D had furnished the most marketable types of hay. On full consideration of the results given in Table II., we now put forward the provisional conclusion that the best feeding value was to be found in sample C, cut when the grain was full size but still in the milky stage. It

should not be overlooked, however, that cuts taken a fortnight later returned appreciably heavier yields.

The compensating rise and fall in the respective weights of the ears on the one hand, and of the culms and flag on the other, have been given graphic illustration in Fig. 2.

CHEMICAL COMPOSITION OF SAMPLES OF HAY CUT AT VARIOUS STAGES OF MATURITY.

Samples of each cut of hay were taken to the laboratory for analysis, with a view to ascertaining the proportions and distribution of the useful feeding units in each of the cuts of hay. We have summarised below, in Table III., percentage figures having reference to these analyses. It will be noted that in each case the composition of the ears is shown separately from that of the culms and flag.

TABLE III.—*Showing Composition of Hay Cut at Various Stages of Development, expressed as Percentages of Oven-dried Material.*

Sample.	Ash.		Proteins.		Fat.		Carbohydrates.		Fibre.	
	Ears.	Culms and Flag.	Ears.	Culms and Flag.	Ears.	Culms and Flag.	Ears.	Culms and Flag.	Ears.	Culms and Flag.
		%		%		%		%		%
A.....	6.98	7.61	14.94	9.06	1.84	1.36	50.11	52.32	26.13	29.65
B.....	6.38	7.83	12.76	7.87	1.42	0.90	52.43	54.15	27.02	29.25
C.....	6.60	7.56	13.37	7.06	1.14	0.94	58.07	54.79	20.82	29.65
D.....	5.98	8.16	11.56	7.37	1.10	1.10	63.61	51.35	17.75	32.02
E.....	5.56	7.96	10.87	6.62	1.20	1.00	67.69	49.94	14.68	34.48
F.....	4.82	7.18	10.56	5.44	1.36	1.06	70.42	48.37	12.84	37.95
G.....	5.46	7.25	11.31	6.50	1.46	1.08	69.22	49.17	12.55	36.00

The figures given in Table III. bear reference to the chemical character of the hay cut at various stages of maturity, and in connection therewith we may note that they serve to bring out the following points:—

1. The percentage of ash or mineral matter remains substantially the same in culms and flag from full bloom time to the complete maturity of the grain. Over the same period of time mineral matter appears to decline steadily in the ears, in which organic matter may be taken to accumulate gradually as the ripening process proceeds.

2. The proteins, or flesh-building materials, are more abundantly present throughout the period under consideration in the ears than in the culms and flag.

3. In both ears on the one hand, and in culms and flag on the other, the percentage of proteins present declines steadily as the ripening process advances. Hence hay cut comparatively early may be taken to be appreciably richer in flesh-forming materials than hay cut somewhat too close to the complete maturity of the grain.

4. The proportion of fat, or oil-like materials, is slightly greater in the ears than in culms and flag. On the whole, however, there appears to be very little difference in the general proportions of fat present in the hay whatever the stage of development it may have been cut.

5. The carbohydrates, which in the cereals are represented chiefly by starch, are appreciably more abundant in culms and flag than in the ears in the early days that succeed full bloom. So soon, however, as the grain has attained its full size the percentage of carbohydrates in the ears begins to exceed that present in culms and flags, and the closer we approach the full maturity of the grain the more pronounced does this difference become.

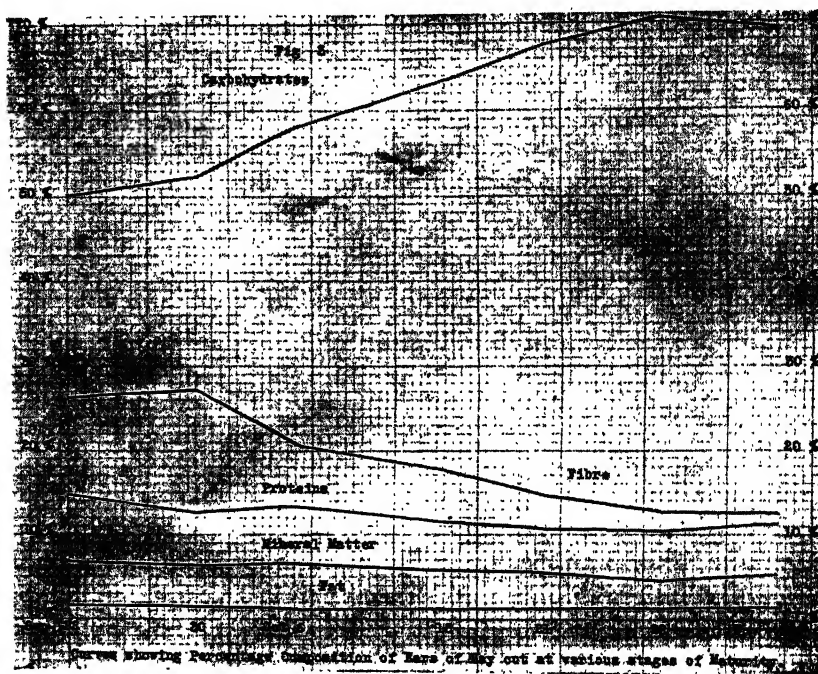


Fig. III.

6. In the ears the percentage of carbohydrates shows a steady rise from full bloom time to the maturity of the grain. It is represented by 50 per cent. of the dry matter in the ears when the plants are in bloom, and by 70 per cent. when the grain is ripe.

7. In culms and flag there is a slow rise in the percentage of carbohydrates present between bloom time and the time when the milky grain reaches its full size, but thereafter there appears to be a steady decline in the starch contents of culms and flag, presumably to the immediate gain of the ears.

8. The proportion of fibre—the most indigestible material in plants—present in both ears on the one hand, and in culms and flag on the other, is always higher in the latter than in the former. In the earlier stages, however, and until the grain has attained to its full dimensions, this difference between the two is comparatively slight. It becomes very pronounced, however, as the maturity of the crop advances.

9. In the ears the percentage of fibre present declines steadily from the period of full bloom to the complete ripening of the grain. This percentage was represented by 26 per cent. when the plants were in bloom, and by 12½ per cent. when the grain was ripe.

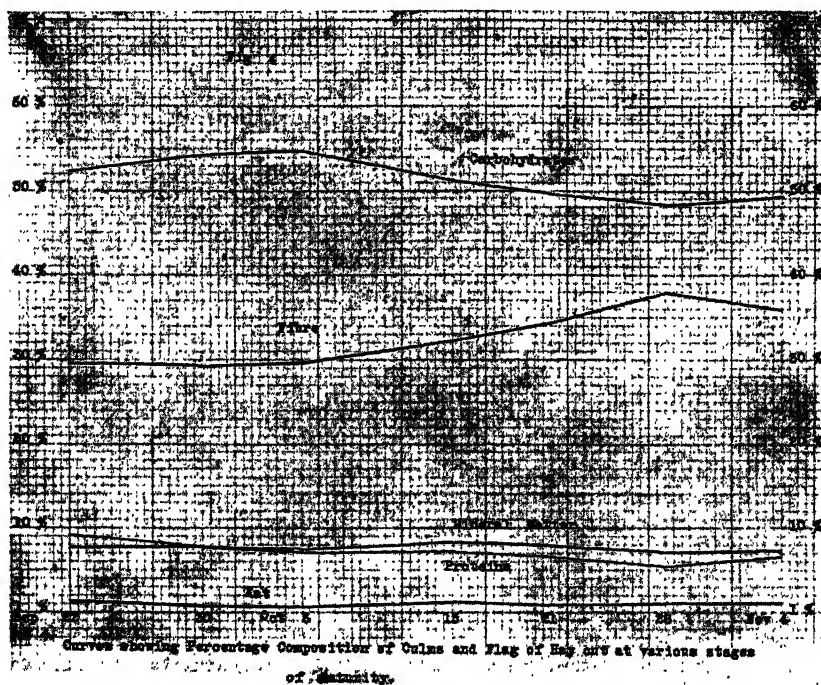


Fig. IV.

10. In culms and flag the percentage of fibre present steadily increases from period to period. It was represented by 29 per cent. when the plants were in bloom, and by 36 per cent. when the grain was ripe.

Figures having reference to the analyses of the ears on the one hand, and to culms and flag on the other, have been given graphic illustration in Figs. 3 and 4 respectively. A careful examination of the curves will render apparent the various points to which we have already drawn attention. It will be of some interest to note the divergence of the carbohydrate and fibre

curves where the ears are concerned (Fig. 3), and their convergence where culms and flag are concerned (Fig. 4).

In Table IV. below, the figures already given in Table III. have been recast so as to show the feed unit percentages in the dry matter of the hay itself, representing as it does a combination of both ears on the one hand, and culms and flag on the other. Side by side of these percentage figures have been shown, in each instance, the number of pounds to which each figure corresponds in 1 ton of hay dried to a 15 per cent. of moisture condition.

TABLE IV.—*Showing Composition of Wheaten Hay Cut at Various Stages of Maturity expressed as Percentages of Total Dry Matter and as Pounds per ton of Hay containing 15 per cent. of Moisture.*

Samples.	Ash.		Proteins.		Fat.	
	Percentage of Dry Matter.	Lbs. to Ton of Hay at 15 % Moisture.	Percentage of Dry Matter.	Lbs. to Ton of Hay at 15 % Moisture.	Percentage of Dry Matter.	Lbs. to Ton of Hay at 15 % Moisture.
	%	lbs.	%	lbs.	%	lbs.
A.....	7.53	143.29	9.85	187.51	1.43	27.11
B.....	7.63	145.09	8.58	163.31	0.99	18.57
C.....	7.43	141.50	7.90	150.51	0.96	18.41
D.....	7.68	146.14	8.30	158.06	1.10	20.95
E.....	7.28	138.66	7.82	148.88	1.06	20.12
F.....	6.39	121.75	7.14	136.02	1.16	22.09
G.....	6.61	125.71	8.24	156.89	1.22	23.18

Samples.	Carbohydrates.		Fibre.		Organic Matter.	
	Percentage of Dry Matter.	Lbs. to Ton of Hay at 15 % Moisture.	Percentage of Dry Matter.	Lbs. to Ton of Hay at 15 % Moisture.	Percentage of Dry Matter.	Lbs. to Ton of Hay at 15 % Moisture.
	%	lbs.	%	lbs.	%	lbs.
A.....	52.02	990.53	29.18	555.56	92.48	1760.71
B.....	53.90	1026.28	28.93	550.78	92.40	1758.94
C.....	55.23	1051.56	28.47	542.03	92.56	1762.51
D.....	54.07	1029.60	28.85	549.26	92.32	1757.87
E.....	54.95	1046.23	28.89	550.11	92.72	1765.34
F.....	55.71	1060.69	29.59	563.46	93.60	1782.26
G.....	56.42	1074.32	27.52	523.90	93.40	1778.29

Figures in Table IV. show that variations in the general average composition of wheaten hay are far less pronounced from period to period than has already been shown to be the case when ears on the one hand, and culms and flag on the other, are examined separately. The reason of this is that within certain limits losses in culms and flag are compensated by corresponding gains in the ears; and in this manner a certain general equilibrium appears to be maintained in the average composition of the plant during the course

of the periods we have had under consideration. Nevertheless, on the whole, the general tendency of advancing maturity is to increase organic matter and correspondingly to reduce mineral matter, to reduce proteins, fats, and fibre, and to augment carbohydrates, which, in the form of starch, slowly accumulate in the grain.

These data bearing on the general average composition of wheaten hay cut at various stages of ripeness have been given graphic illustration in Fig. 5,

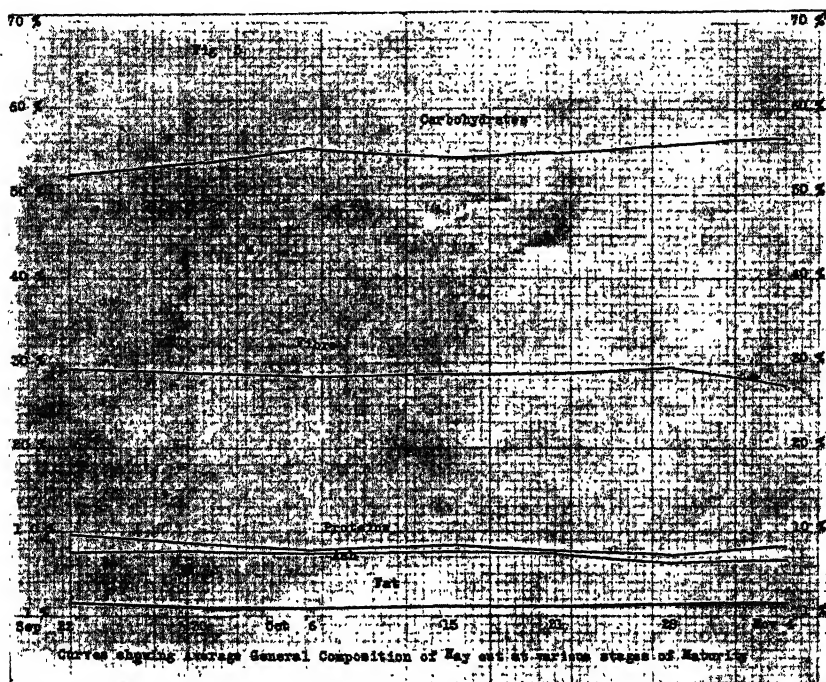


Fig. V.

which should be compared with the corresponding Figs. 3 and 4. The fact that the curves in Fig. 5 all tend more or less towards regular horizontality indicates clearly enough the existence of general stability of composition in the wheat plant between bloom time and the ripening of the grain. The ripening process would appear, therefore, in the wheat plant to consist mainly in migration of organic compounds from culms and flag to the seed and seed receptacles represented by the ears. It does not, however, appear to have the effect of materially altering the general centesimal composition of the plant taken as a whole.

THE RELATION OF THE COMPOSITION OF WHEATEN HAY TO THE
CUTTING PERIOD.

Can the composition of wheaten hay cut at various stages of maturity throw any light on the stage that is likely to yield the most valuable type of hay? We fear not; not at all events beyond the general facts that we have already established, viz., that as maturity advances culms and flag are slowly robbed of their nutriment by the swelling ears, and become in consequence more and more strawlike. This fact is further emphasized in Table V., in which is shown the distribution per acre in pounds of the various substances present in the hay at the different stages of maturity.

TABLE V.—*Showing Distribution of Hay Constituents in Ears on the one hand, and in Culms and Flag on the other, at Various Stages of Maturity, Expressed as Pounds per Acre.*

Sample.	Dry Matter.			Ash.			Proteins.			Fat.		
	Culms and Flag.			Culms and Flag.			Culms and Flag.			Culms and Flag.		
	Ears.	lbs.	Total.	Ears.	lbs.	Total.	Ears.	lbs.	Total.	Ears.	lbs.	Total.
A.....	665	4,296	4,961	46	327	373	99	389	488	12	58	70
B.....	906	5,362	6,268	58	420	478	115	422	537	13	48	61
C.....	786	5,085	5,871	52	384	436	105	359	464	9	48	57
D.....	1,453	5,083	6,536	87	415	502	168	375	543	16	56	72
E.....	1,881	4,785	6,666	105	381	486	204	317	521	23	48	71
F.....	1,857	3,723	5,580	90	267	357	196	203	399	25	39	64
G.....	1,859	3,279	5,138	101	238	339	210	213	423	27	35	62

Sample.	Fibre.			Carbohydrates.			Organic Matter.		
	Culms and Flag.			Culms and Flag.			Culms and Flag.		
	Ears.	lbs.	Total.	Ears.	lbs.	Total.	Ears.	lbs.	Total.
A.....	174	1,274	1,448	333	2,248	2,581	618	3,969	4,587
B.....	245	1,568	1,813	475	2,904	3,379	848	4,942	5,790
C.....	164	1,508	1,672	456	2,786	3,242	734	4,701	5,435
D.....	258	1,628	1,886	924	2,610	3,534	1,366	4,669	6,035
E.....	276	1,645	1,921	1,273	2,390	3,663	1,776	4,400	6,176
F.....	238	1,413	1,651	1,308	1,801	3,109	1,767	3,456	5,223
G.....	233	1,180	1,413	1,287	1,612	2,899	1,757	3,040	4,797

A consideration of Table V. will serve to show, in the first place, that between September 22nd (full bloom) and October 21st (grain in dough stage) there is a steady increase in the dry matter of the ears, which has practically trebled in that space of time. Thereafter, to the ripening of the grain—a period of 14 days—the dry matter in the ears remains practically stationary.

Over the same period of time, the quantities to the acre of ash, proteins, and fat in the ears have practically doubled. These same constituents, however, remained stationary in the last 14 days of plant development.

In the ears, fibre reaches a maximum on October 21st (grain in early dough stage), representing an advance of about 57 per cent. of the quantity originally present at full bloom. In the last fortnight of the development of the plant there is a distinct decline in the amount of fibre present in the ears to the acre, represented by about 18 per cent.

Carbohydrates—mainly starch—increase in quantity in the ears to October 28th (grain in late dough stage), by which time there was four times as much starch in the ears as there was originally at full bloom time. In the last week of development of the plant the starch contents to the acre of the ears remain practically stationary.

The total organic matter of the ears corresponds in its progress to that of the dry matter, viz., it comes to a maximum when the grain enters upon the dough stage, but thereafter continues stationary.

In culms and flag we note an increase in dry matter to September 30th (grain just formed); thereafter dry matter declines steadily and continuously to the ripening of the grain. When the grain is ripe there is fully 21 per cent. less dry matter in culms and flag than there was at full bloom time.

In the ash, proteins, and fat there is an equally steady decline in culms and flag from the time the grain was formed to its complete maturity.

In fibre, on the other hand, there is a steady increase in culms and flag to the end of the dough stage; thereafter there is a heavy decline, attributable probably to the fall of the flag.

Carbohydrates and total organic matter follow the same course as dry matter, *i.e.*, they reach a maximum just as the grain is formed; but thereafter decline steadily and progressively to the complete ripening of the grain.

These facts, it appears to us, clearly demonstrate the gradual impoverishment of culms and flag for the benefit of the ears as the maturity of the crop advances. Hence, although in an acre of late-cut hay there may be quite as much total nutritive matter as in an acre of hay cut somewhat on the green side, the useful constituents will be concentrated in the ears, whilst culms and flag will have lost much of their value. We feel justified, therefore, in continuing in the belief that wheaten hay cut whilst the grain is still milky must prove superior as an all-round foodstuff to wheaten hay in which the grain has already entered upon the dough stage.

THE DIGESTIBILITY OF WHEATEN HAY.

The value of any foodstuff is not necessarily proportional to its tenor in certain chemical compounds. Much, no doubt, depends on the digestibility of the latter, *i.e.*, on the ability of the digestive organs of livestock to absorb them into the general system of their owners. It is equally certain that the digestibility of these useful plant constituents varies very largely with the state of maturity of the plant. Thus, the soft cellulosic tissues of

young plants are admittedly more readily digestible than the more or less hard and fibrous tissues of plants approaching maturity. Similarly the green tissues of plants are more highly digestible than the same tissues dried to the consistency of hay. In this connection, therefore, we are perhaps justified in inferring that the coefficients of digestibility of over-ripe hay will probably prove lower than those of hay cut closer to full bloom time; and that in consequence the latter will, from another point of view, have higher general feeding value, weight for weight, notwithstanding a general similarity in composition between the two. We recognise, however, that on this matter we are unable as yet to support our inference by anything more than analogy. We did not test the digestibility of hay cut at various stages of maturity; nor are we aware of the existence of any experimental work on the subject that might serve to settle this point definitely. In the coming season, however, we propose repeating on a larger scale the work attempted in 1911, and if circumstances permit of it, completing our original work by careful investigations into the relative digestibility of cereal hay cut at varying stages of maturity.

FACTORS THAT LEAD TO THE LOSS OF DRY MATTER IN THE RIPENING WHEAT CROP.

We have already drawn attention to the fact that in the fortnight immediately preceding the complete ripening of the grain, a standing wheat crop not only does not add to its total dry matter, but that under our conditions there appears to set in a heavy shrinkage and waste of dry matter; all of which goes towards reducing what may be termed the hay yields of the crop. The importance of this phenomenon and its relative incidence has already been indicated in Table V. For the sake of clearness the position may be briefly summarised as follows:—(1) The total dry matter to the acre would appear to increase progressively from full bloom to the dough stage of the grain, by which time the whole of the flag is dry (sample E); (2) from the dough stage forward appreciable losses would appear to set in (very slight in the case of the ears but very pronounced in culms and flag) in which in the course of 14 days the loss of dry matter attained to close on 32 per cent. of their original weight of dry matter.

This loss of dry matter in the wheat plant in the last stages of its development was, we believe, first drawn attention to by Isidore Pierre, in 1864. Since his time it has been customary to account for the loss (1) by the fall of the exhausted flag; (2) by the shaking out of the grain and other accidental losses; (3) by the weakening or suspension of assimilation, involving the manufacture of organic matter and the consequent inability of the plant to make good losses attendant on the respiratory function; and (4) by the leaching action of occasional rains on the more or less porous and dry plant tissues.

Unquestionably these several factors, each in their own sphere, will serve to reduce the total amount of dry matter observable in the plants as maturity advances. Our last season's results, however, would appear to point to an additional factor which, if supported by later observations, is worthy of consideration.

It will be evident that if the factors already indicated are alone responsible for the apparent loss of dry matter observed between the dough stage of the grain and its complete ripening, then the amount of organic matter lost should be proportionately greater than that of the mineral matter or ash; or at all events the losses of the latter should not exceed those of the former. That our observations were not in accordance with these facts the following figures will clearly show :—

Loss of protein	98lbs.
“ fat	9lbs.
“ fibre	508lbs.
“ carbohydrates	764lbs.
<hr/>	
Total loss of organic matter	1,379lbs. or 22·3 per cent.
Total loss of mineral matter	147lbs. or 30·2 per cent.
<hr/>	
Total loss of dry matter	1,526lbs. or 22·9 per cent.
<hr/>	

It will be seen, therefore, that the losses of mineral matter between the 21st of October and the 4th of November were proportionately heavier than those of organic matter in the same period of time. This anomaly cannot, in our view, be attributed to the greater solubility of mineral matter in what rains may have fallen. Between October 21st and November 4th we registered no more than 17 points of rain in three separate falls, the leaching influence of which, under our conditions of climate, must have been altogether infinitesimal.

If, on the other hand we were to assume that the whole of the organic matter which disappeared during this period of 14 days in culms and flag, viz., 1,360lbs. to the acre, were represented by fallen flag—which would be a manifest exaggeration of the case—this loss, at an average percentage of 7·46 of mineral matter, would serve to account for 101lbs. of the total ash lost, and leave an unaccounted balance of 46lbs. to the acre. It seems to us probable, therefore, that as maturity progresses and the root action of the plant becomes feeble, there arises a tendency towards retrogressive migration of useless mineral matter towards the root system, thus bringing in an additional factor the action of which would be towards the further reduction of total dry matter to the acre in plant tissues. This view would appear to be borne out by the fact that the tissues of the plant appear to

become perceptibly poorer in mineral matter during this last stage in their evolution. We hope to obtain more definite light on this matter in the course of future investigations.

GENERAL PROVISIONAL CONCLUSIONS.

We are very far from assuming that the partial experiments of a single season can offer anything like a substantial basis for definite conclusions in any direction. What we put forward in the way of conclusions we hasten to qualify as provisional and tentative, and hope that they will be taken as such.

(1) Those who wish to secure the heaviest yields of wheaten hay to the acre must defer putting the binders into the field until the grain has fully reached the dough stage.

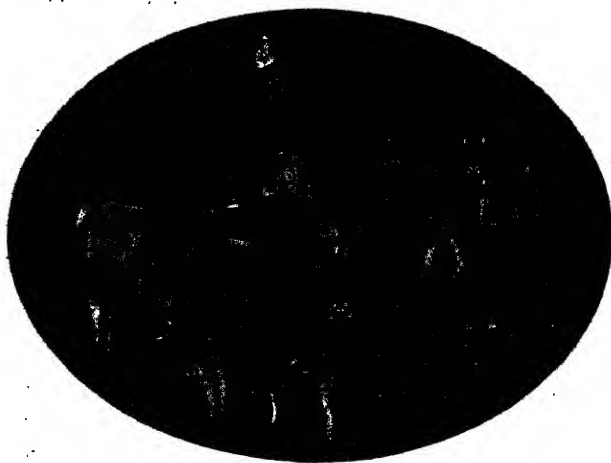
(2) Hay secured at this stage of maturity will prove dry and bleached, and carry with it a large proportion of grain. It will probably be more or less indigestible and, weight for weight, will not be the equal as a foodstuff of hay cut at earlier stages.

(3) Those who cut wheaten hay late with a view to securing heavy yields must carry out the work with the utmost expedition, since a tendency towards the shrinkage of yields will set in very soon after the maximum has been reached.

(4) The highest quality hay will be secured if cut when the grain is full size, but still in the milky stage.

(5) In hay cut at this stage, ears, culms, and flag will all prove equally nutritious, and if carefully cured will show a bright green color and a small quantity of shrivelled grain.

(6) The usual commercial standards for quality in wheaten hay—color and shrivelled grain—are, in our opinion, amply justified.



EXTRACTS FROM TRADE COMMISSIONER'S REPORTS.

The following are extracts from the Trade Commissioner's reports, respectively dated London, April 26th and May 3rd:—

BRISTOL EXHIBITION.

"The finest show yet staged by South Australia is now being exhibited at the Bristol Grocers' and Bakers' Exhibition. The stand previously erected at Glasgow has been enlarged upon, and extra scenic effects have been introduced, and scenery has been placed all round the four walls representing wine, wool, fruit, and wheat growing industries. The centre of the floor space is taken up by a huge pyramid of 1,008 bottles of honey, whilst the rest of the products, comprising bottled fruits, preserved meats, wines, etc., have been placed in rustic kiosks situated in the respective corners of the room.

"The exhibition has created quite a sensation in Bristol, and has been crowded since the opening. In addition to placards notifying the general public from which firms the goods can be purchased, I have made arrangements with five of the leading shopkeepers, who are now displaying their shop windows dressed with nothing else but Australian products. I disposed of 2,000 pots of honey at the first two day's show, and expect to considerably add to this number before the exhibition finishes. I have extended invitations to the leading schools of Bristol, as well as to all organizations that are likely to be interested in the State.

"Very fine editorial notices, giving full details, have appeared in the newspaper reports of the exhibition."

AVONMOUTH DOCKS.

"I inspected these docks in company with the General Manager last week, and was much struck with the up-to-date facilities at present erected there for the handling of frozen meat. Avonmouth, being the port of Bristol, offers splendid facilities for the distribution and sale of all classes of produce. At the present time we are selling from 500 cases to 700 cases of South Australian apples per week in Bristol, as well as disposing of large quantities of frozen meat in the meat season, our only difficulty being that the stuff has all to be delivered *via* London.

"The South Australian Court, at the recent exhibition, which has attracted Bristol buyers to our various lines of produce, has already been the means of increasing the trade between Bristol and South Australia, and I feel sure that, if shipments are made direct next season, good results can be expected."

ANALYSES OF FERTILISERS.

The following are further results of analyses made by the Government Analyst (Mr. W. A. Hargreaves, M.A.) of samples of fertilisers taken since the beginning of the year.

Name.	Phosphate.						Nitrogen.	
	Water Soluble.		Citrate Soluble.		Acid Soluble.		Result of Analysis.	Vendor's Guarantee.
	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.		
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Adelaide Chemical & Fertiliser Co., Ltd.—								
“Guano super.”	27.14	25.00	3.16	5.00	3.46	6.00	—	—
“ “	27.41	25.00	7.47	5.00	5.83	6.00	—	—
“Mineral super.”	33.96	36.00	—	—	—	—	—	—
“ “	39.50	36.00	—	—	—	—	—	—
“Super B.”	16.27	12.00	18.39	14.00	8.35	8.00	—	—
“Bone super.”	17.63	15.00	16.04	15.00	10.71	6.00	1.78	1.60
“S.A. super.”	32.18	30.00	—	—	—	—	—	—
Crompton & Son—								
“Pure bonedust”	—	—	—	—	43.37	44.67	4.04	3.8
“No. 1 fertiliser”	—	—	—	—	14.34	10.00	4.54	3.3
Elder, Smith, & Co., Ltd.—								
“Laves super.” (ex s.s. <i>Bougainville</i>)	36.48	38.00	—	—	—	—	—	—
Hasell, A. H.—								
“Hasell's guano super.” (ex <i>Stenaei Mara</i>)	26.89	29.00	2.66	2.00	4.10	4.00	—	—
International Fertilisers Co. of Aus.—								
“A.A.B. fertiliser”	34.50	32.00	—	—	—	—	1.75	1.75
Wallaroo Phosphate Co., Ltd.—								
“Wallaroo super.”	39.92	36.00	—	—	—	—	—	—

Geo. Quinn, Inspector of Fertilisers.

LUCERNE HAY AND CHAFF.

VALUE TO THE FARMER.

Writing under date May 23rd, Mr. S. McIntosh, Director of Irrigation, states :—" As an indication of how the fodder market in Melbourne is being affected by the continuous spell of dry weather, I would call attention to last week's market sales, which are highly interesting to our settlers on the reclaimed areas and wherever lucerne can be grown, either with or without irrigation. The report reads—' The dry season was reflected in the produce market, prime chaff selling up to £5 15s. and medium at £4 15s., while straw chaff was worth from £3 to £3 10s., according to sample. Prime trussed hay sold for £6 10s., sheaves £5 5s., and chaff £4 15s. Tasmanian straw was firm at £3 5s., and Victorian straw at £2 5s. to £2 10s. The market for lucerne was firm. Good to prime hay being quoted at £5 15s. to £6, and choice to £6 10s. Lucerne chaff had sales at up to £7.'

" The difference between prime oaten and wheaten chaff at £5 15s. per ton as against lucerne chaff at £7 is surely a proof that the Victorian public have at last realised the true value of the feeding qualities of the ' king of fodders.' It is a poor stand of lucerne on the reclaimed areas that will not return an annual hay yield of 7 tons per acre, while a good average crop will produce from 10 tons to 12 tons per acre. The best summer cuts run from 2 tons to 3 tons per acre.

" From the Murray Bridge Experimental Farm sales it has been demonstrated that there is a steadily growing demand for lucerne chaff in South Australia. Every season since we started selling the orders have been very considerably in excess of the available supply. For the year just closing not one-fourth of the demand could be met.

" Wherever the conditions are satisfactory, lucerne-growing as a profitable venture compares more than favorably with any other line of agriculture, and certainly offers better net cash returns. In the western and south-western States of America practically no other fodder than lucerne hay is used for horses and cattle, and I certainly never saw stock in better condition than in the country in question. Texas E.S. Bulletin No. 66 gives the following comparison of alfalfa or lucerne hay with oaten hay :—

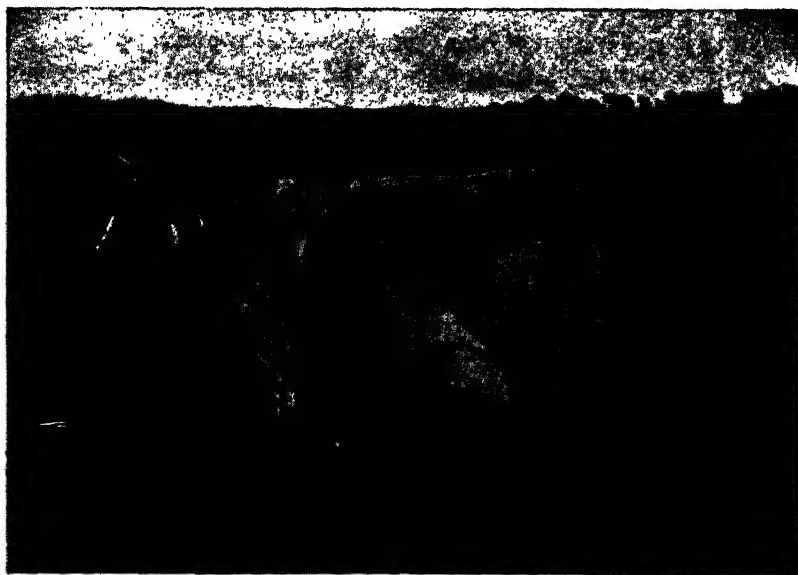
	Digestible Nutrients in 100lbs.			
	Dry Matter in 100lbs.	Protein.	Carbo- Hydrates.	Ether Extract.
Lucerne hay	91.6	11.0	39.6	1.2
Oaten hay	91.1	4.3	46.4	1.5

"Lucerne chaff is certainly a more appetising and natural stock food than dry oaten or wheaten chaff, and it certainly has much in its favor to recommend it as a change to our standard fodders.

"In the dry States of America it is estimated that nearly half a million acres of land are irrigated from wells. The greater portion of this area is planted with lucerne. In Arizona I inspected one ranch on which over 2,000 acres of lucerne were irrigated from wells. The annual hay return per acre was from 8 tons to 10 tons. The whole of the crop was cut for hay, baled and marketed.

"On hundreds of our South Australian farms and stations lesser or greater areas could be laid down with lucerne and irrigated from wells, springs, or creeks. During good seasons the hay could be stocked for use in the lean years (if not required for immediate use), and thus save the lives of thousands of stock.

"The farmer or grazier residing in a district where the rainfall is less than 20 in. per annum, with water and soil suitable for growing lucerne or fodder crops and possessing the necessary capital for the initial outlay, might well, in the event of his stock dying of starvation, be prosecuted for cruelty to animals."



"Blue Ribbon of Turretfield."

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, May 8th, there being present Messrs. A. M. Dawkins (Chairman), C. Willcox, Professor Lowrie, Professor Perkins, Col. Rowell, Messrs. C. J. Valentine, C. J. Tuckwell, T. H. Williams, J. Miller, John W. Sandford, and G. G. Nicholls (Secretary).

APPOINTMENT OF PROFESSOR LOWRIE AS A MEMBER.

The Chairman mentioned that the Minister (Hon. T. Pascoe) had approved of the appointment of Professor Lowrie as a member of the Board. On behalf of the Board he extended a cordial welcome to the Director of Agriculture.

NOXIOUS WEEDS.

The Secretary reported that in response to the recommendation of the Board that the Government should introduce a Bill to provide new legislation for the destruction of noxious weeds and place the administration of the Act in the hands of the Department of Agriculture, the Minister had made the following memorandum:—"I should be glad if the Advisory Board would give some idea in detail of the scheme which it has in mind. There are difficulties in the way of administering an Act such as that indicated from a central office, as it would mean the duplication of officials and entail very much heavier expense to the landholders. Further, weeds that are noxious in certain localities and soils, including Salvation Jane, have proved to be useful fodders in other places." After consideration, Professor Perkins and Messrs. G. R. Laffer and Jno. Miller were appointed a committee to prepare a scheme to be submitted to the Board.

EXCURSION RAIL TICKETS TO THE SHOW.

A letter from the Miltalie Branch contained an inquiry as to whether excursion tickets to be issued in connection with the Spring Show in Adelaide in September would be available for the return journey for a month? The Secretary reported that he had communicated with the Railways Commissioner, who had replied that these tickets would be available for return for one calendar month from the date of issue.

PROPOSED TAX ON SUPER.

The Secretary reported that 11 Branches of the Agricultural Bureau had entered emphatic protests against the proposal to place a duty upon imported superphosphate. After some discussion it was resolved, on the motion of Col. Rowell, seconded by Mr. Willcox—"That this Board considers that the imposition of a duty on imported superphosphate will not be in the interests of the producers of this State."

THE FIRST LIFE MEMBER.

A recommendation was received from the Green Patch Branch that Mr. E. M. Sage, of Port Lincoln, who had been secretary for a number of years, and for a long period had formerly occupied a similar position in the Balaklava Branch, should be made a life member. Particulars of the sterling service rendered by Mr. Sage in the interests of the Bureau were given by the Secretary and, on the motion of Mr. Willcox, seconded by Mr. Valentine, Mr. Sage was unanimously approved as a life member of the Bureau.

LUCERNE SEED.

Mr. Miller said he understood that sometimes certain men had been selling lucerne seed that was not true to name. The sellers concerned were chiefly in another State. In some instances the same variety of seed had been supplied to fill an order for several different sorts. Professor Lowrie observed that some of the seedsmen had undoubtedly been selling the wrongly named seed in all good faith. They had been "let in" by the people from whom they had obtained supplies. Col. Rowell contended that the South Australian seed was the best on the market. In his locality growers sowed it in preference to Hunter River. Professor Perkins said that, at Roseworthy, American had proved to be the best variety. More frequent cuts could be secured from it, and it grew better in the winter under their conditions.

SPINELESS CACTUS.

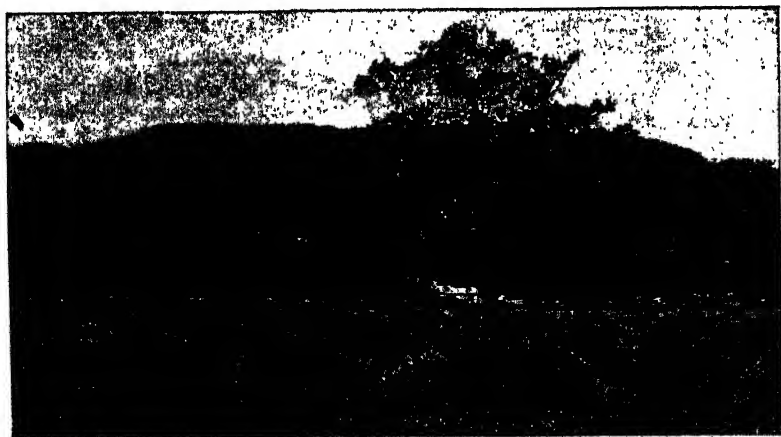
The Chairman said the producers were under a deep obligation to Professor Perkins for the interesting and instructive articles on his travels, which had appeared in the press. He had been particularly interested in references to the spineless cactus. He would like to know whether it could be grown and profitably utilised in this State? Professor Perkins, in reply, thought it would be worth trying, especially in years such as the present. He had a small patch of the cactus at the College, and intended to plant a corner of one of the paddocks with it. There was no likelihood of it spreading and becoming a pest here. Three years must elapse from the time of planting before it could be cut without injury and fed to stock. Stock appeared to like it. There was a fair quantity of the cactus growing at Langhorne's Creek.

NEW BRANCH.

The formation of a Branch of the Bureau at Gladstone was approved, with the undermentioned gentlemen as members:—Messrs. J. Sargent, W. O'Grady, J. Potter, W. Sargent, T. Hollitt, P. Sampson, T. Mutter, F. Mutter, R. Peters, W. Odgers, W. Growden, W. Hudson, G. Fisher, J. Connolly, T. Sando, W. Brayley, A. Anderson, R. Humphris, T. Brown, H. Fay, G. Black, W. Deeble, A. Carter, F. Aughy, R. Lines, W. Hancock, J. Smallacombe, E. Davies, H. Schultz, A. Dinning.

NEW MEMBERS OF BRANCHES.

The following gentlemen were approved as members of the Branches as shown:—Yongala Vale, Messrs. B. Webb, G. H. Jansen; Lyndoch, W. F. Haese; Yabmana, A. R. Binke, J. Y. Pengeley; Dawson, H. Davies; Arden Vale and Wyacca, L. Schuttoffel; Riverton, Ross Wilkinson, J. Johnson; Redhill, H. Briggs; Narrung, M. B. Hunt, G. A. McNicol, P. J. Clarke; Angaston, J. C. Jacobs; Keith, M. Torr, J. McIntyre; Parilla Well, J. Flavel, W. Flavel, H. Leak, J. Johnston, H. Hockley; Whyte-Yarcowie, A. J. Pratt; Kanmantoo, Timothy Nolan; Colton, L. Larwood; Mount Barker, S. L. Hayman, Oscar Hughes; Wirrabara, F. T. Jettner; Kalangadoo, Thos. Bott, J. McKenzie; Hookina, C. B. Thompson; Greenock, R. E. Radford, P. Gehling, E. Geyer, O. Kruger, J. G. Arnold, W. Roenfeldt, D. B. Seebo, P. Kernich; Wilkawatt, M. Neville, M. H. Gasmier, H. H. Pritchard; Elbow Hill, P. C. Wake, A. C. Wake, E. Story; Morchard, G. McKenzie; Lameroo, W. Lehman; Pinnaroo, H. E. Dibben, L. M. Ferguson, J. Letheby; Willowie, B. Bull, F. Richter.



A HARVEST FIELD.

SUPPLY OF STORE AND DAIRY CATTLE.

VALUE OF MILK RECORDS.

By ALFRED MANSELL, in *Journal of British Board of Agriculture*.

The question of the supply of suitable store cattle for the requirements of the feeder is of paramount importance at present. Its consideration is necessarily connected, however, with the enormous growth of the dairy industry, brought about by the annually increasing demand for dairy products.

The various breeds and crossbreeds all have their advantages and adaptability to certain districts, but the same general requirements must be fulfilled, such as early maturity, soundness and vigor of constitution, and economical production of meat of prime quality. These can only be secured by careful selection in type and conformation and the avoidance of breeding from scrubs, either on the side of the dam or sire.

BREEDING AND FEEDING FOR BEEF PRODUCTION.

Speaking generally, the beef market now requires a medium-sized early maturing animal of the short-legged, blocky type, and well developed in all the best parts. Not only must the breeding be such as to produce this class of animal at maturity, but the calf must maintain a continuous growth from the time of its birth, and its development must not be retarded by withholding, even for a short period, an adequate supply of food to promote a healthy and vigorous body.

In rearing store cattle, whether for sale or ultimately disposing of as beef, everything should be done to keep on the calf flesh, to promote a healthy and vigorous growth and sound constitution; and this can only be secured by a liberal supply of food under such conditions as will promote a full growth of hair, which enables them to withstand the inclement weather usually prevailing in the early months of the year. Cattle reared in this way may be described as thrifty, and are always keenly sought after.

The aim should be to rear the calves in as natural a way as possible, and in the case of heifer calves intended to go into the dairy, it is a great mistake to get them fat; they should run in open yards, have plenty of exercise, regular feeding, and to promote the dairy qualities they should be allowed to calve at about two years old rather than later.

If once a young animal is allowed to sink in condition, no amount of subsequent high feeding will bring it back to the same thrifty state, and it will never develop the same depth of flesh; on the contrary, if put on liberal rations it will become fatty, and lack the nicely marbled meat which it should be the aim of every feeder to secure.

In the past, large cattle, three to four years old, were readily disposed of for killing, but the public taste now prefers young, juicy meat, which can only be obtained from well-bred animals which have been liberally treated from birth, and are fit for the butcher at from 20 to 24 months old.

USE OF THE CALVES FROM DAIRY CATTLE AS "STORES."

Recognising that to produce first-class beef the foregoing conditions must prevail, it is a matter of surprise that a great many indifferent store cattle are placed on the market which, when fattened, can only compete with even inferior imported beef, and must leave very unsatisfactory results to the feeder.

The reason, which is obvious to anyone interested, is that a large proportion of these stores are the offspring of dairy cattle by scrub bulls, the breeder's primary consideration being to secure a new milch cow.

These miserable calves are usually sold at birth, are reared very badly, and taking into consideration their parentage and early treatment, can never be expected to develop into vigorous and thrifty cattle.

NECESSITY FOR GOOD SIRE.

Again, many of our small farmers, who may or may not be sellers of dairy produce, cannot afford to buy a good bull, and they have to resort to inferior animals to enable them to continue their breeding operations.

Much has been said of late about the somewhat wholesale slaughter of calves, but I cannot think this prevails to any large extent where a good bull has been systematically used. In most cases where good sires have been continuously used, even on dairy cattle, the breeder has had no trouble in finding a customer at good prices for his calves for rearing purposes.

It is not reasonable to expect that a market can be found for mongrels out of herds in which the custom has been to use any class of sire to secure pregnant cows.

There seems to be a general impression that it is impossible to secure a suitable bull for a dairy herd, which could beget bull calves (to be steered), which will make good beef cattle. I cannot subscribe to this notion, as it surely cannot be necessary to eliminate in dairy-bred bulls good conformation, wealth of flesh, and other desirable points likely to produce good feeding cattle.

A method of encouraging the use of good bulls which has been adopted by the Flint and Denbigh Hunt may be mentioned. A bull is purchased by the

Hunt committee, and a stud fee of 1s. per cow is paid to the farmer in charge, who also receives 5s. per week for the keep of the bull during about 24 weeks of the season. During the 16 years of the existence of this scheme 16,230 cows have been received, and in the opinion of those best able to judge, this use of good bulls has raised the value of the stock by from £2 to £3 per head, or, at a moderate computation, it has added a capital value of £35,000 in stock to the wealth of the district.

Mr. Robert Bruce, of the Royal Dublin Agricultural Society, also speaks in high terms of the results achieved in the improvement of cattle in Ireland by a somewhat similar scheme initiated by the Royal Dublin Society, and latterly carried on by the Irish Department of Agriculture. A certain sum, say £15, is paid by way of premium for a bull selected by a farmer for his own and his neighbor's use, if such bull fulfilled certain requirements as to pedigree, etc.

The premium may be extended for a second or even a third year, if the bull proves to be a desirable and fruitful sire.

In non-dairying districts a scheme of this kind should prove of great assistance in raising the general standard of quality of the cattle.

VALUE OF MILK RECORDS.

I am glad to note that a movement is on foot towards a more universal adoption of milk records.

This movement has my heartiest approval, as I am convinced that in a large number of cases very unprofitable cows are kept in many dairies. If a farmer can increase his yield per cow by only 100galls. per annum, it means a considerable addition to his income, and greatly adds to the capital value of the herd.

To know with certainty which cows are profitable, and which heifers should be kept to add to the herd from time to time, it is absolutely essential that a milk record should be kept.

For all practical purposes it would suffice to weigh (rather than measure) each cow's milk once a week, and it would be a splendid education for a farmer's son to see this properly carried out.

It is also important to test the quality of the milk as regards butter fat, because it does not necessarily follow that the cow which gives the most milk is the one most profitable to the farmer. The necessary apparatus is not costly, and any farmer who cares to take the trouble can easily carry out the test.

When this is efficiently performed, a farmer is able to weed out the non-paying cows, and gradually build up a herd of good paying animals, and from these profitable cows he should be able to sell his bulls at good prices to dairy farmers.

In an admirable paper read before the Glasgow Agricultural Discussion Society in 1908 by the late Mr. John Speir, who was without doubt a great authority, it was stated that in the Gaupen Milk Record Society of 12 herds, each pound of butter produced during the first year of its existence cost 8d. per pound for food alone, whilst then (1908) it was produced for 4½d. and 4¾d. It was also claimed that milk records enabled the breeder who read them aright to increase his profits in two ways—(a) By increasing production ; (b) by decreasing his expenses.

Mr. Speir quoted the following authentic cases :—

(1) When the late Mr. Tisdale, of Holland Park, began farming, he bought 12 of the best heifers he could find, and bred from the best of these and their produce for 25 years, during which period each cow's milk was regularly weighed. His average for the best 12 heifers in his possession during his occupancy of Holland Park was as follows :—For the first year, 450galls ; for the tenth year, 600galls. ; for the twentieth year, 868galls.

(2) Mr. John Evens, Burton, Lincoln, who received the first prize for the best managed farm in the show district of the Royal Agricultural Society in 1908, began to weigh the milk of each cow in March, 1885, and had continued to do so twice daily ever since. In 1890 and 1891 the average number of cows in milk was 33, which gave an average yield of 729galls. for these years. In 1904 and 1905 he had an average of 48 cows which gave 828galls, while the 33 best cows in 1905 gave an average of 923½galls.

(3) The first society to keep milk records on a co-operative basis was that of Vejen. The average yield per cow for 12 herds for the first two years was 670galls., and the average for the eighth year was 730galls.—an increase of 60galls. per cow all round. This, at 8d. per gallon, would be an increased return of 40s. per cow. Some of the herds, however, gave very much greater increases, viz., from 477galls. to 880galls., and from 574galls. to 836galls.

(4) A farmer in Sweden, who prided himself on having an extraordinarily good milking herd, joined one of the milk record associations in 1897, and during his first year his herd of 70 gave an average of 800galls. of milk. He sold off 42 of his worst milking cows and kept 28 of the very best, which he mated with a bull out of a known heavy-milking cow. In 1905 he had again a herd of 72 milking cows, all descended from these 28 selected animals, which gave an average of 1,220galls. in that year.

(5) One society in South Sweden, that of Vallakra, where Ayrshires were in great request, increased its average yield per cow from 670galls. of milk during the first year to 876galls. in its sixth year. During the first year of its existence the average percentage of fat in the milk was 3.09, whilst in its sixth year the average increased to 3.21 per cent. of fat, notwithstanding the fact that the quantity of milk was 31 per cent. greater than it was six years previously.

(6) From 1898 to 1903 Dr. Woll, of the Agricultural College of Wisconsin, caused every separate article of food which was given to each of the 35 to 38 cows in the college herd during that period to be weighed. The milk was also weighed and analysed. The herd was composed of selected specimens of each of the three or four principal dairy breeds. The results showed that, while one cow yielded butter of the annual value of £20, after payment had been made for all her food, the yield of butter from the others dropped gradually till one actually produced £1 less value in butter than had been the cost of food alone consumed by her during that year. In the other two years during which the cow was tested she gave a small profit. These experiments conclusively proved that pedigree was of far greater importance than food in the production of milk or butter.

PREEDING FOR DAIRYING PURPOSES.

The dairyman's aim should be to secure a good roomy class of Shorthorn or Shorthorn cross cow with size, flesh, and milk, in contradistinction to the cow having a tendency to grow fat and lumpy, with a poor udder and doubtful breeding qualities.

One of the greatest troubles the dairy farmer (who gives thought to his business) has is to obtain a bull from a cow with a good milking record, and the keeping of milk records would help in this direction.

A great danger to the country, which must have disastrous results in the near future, is the wastage of our very best dairy cows through their finding their way to our populous towns, and being eventually sent to the butcher when their yield of milk fails to prove remunerative to the owner. This system means an annual slaughter of a large number of our best dairy cattle, and great efforts should be made to stem, if not entirely to put an end to, this wholesale sacrifice of these fine animals, which should, if properly mated, reproduce what the nation is most in need of. One way to do so would be to lessen the number of town dairymen who do not have their cows bulled, but find it cheaper to milk the cow as long as she is profitable, and then dispose of her as beef to the butcher. This, considered from all points, is a difficult problem, and the question as to what can be done to induce the town dairyman to have his cows bulled is not easy of solution. At the same time there cannot be any doubt that he should be able to dispose of his calves at good prices, and, moreover, he would not be continually in the market for newly milched cows, for which he frequently pays extravagant prices. I am rather of opinion that if the town dairyman gave it a trial he would find it not so unprofitable as he seems to think, as his expenditure in providing new milched cows would be much reduced, as he would have a certain number of his best cows periodically returning to profit.

THE WHEAT MARKET.

Notwithstanding an easier tendency in the London market, the price for wheat locally remained fairly stationary during May, on the basis of 3s. 11d. to 4s. for farmers' lots on trucks at Port Adelaide. Holders, it was reported, were disinclined to sell, and probably the outlook for next season, both in this and the eastern States helped to maintain prices at their comparatively high levels.

Under date, May 3rd, *Beerbohm's Evening Corn Trade List* states—"The wheat-market has been quieter during the past week than for a long time past, and what may be described as a natural reaction in prices has taken place. Conditions, so far as supplies in the near future are concerned, have changed completely. In the first three months of the year, partly owing to exceptional causes, such as the strike in the Argentine, shipments were small, and stocks steadily decreased; this caused a very fair advance in prices. In April, imports increased, and the quantity now afloat is sufficiently large to guarantee ample supplies for some time to come, even with quite moderate shipments for the next two or three months. Now that maize is beginning to move freely from the Argentine, wheat exports will, no doubt, be on a distinctly smaller scale than recently; but against this must be put the expected very much larger exports from Canada. With regard to the more distant future, very little can be said until a definite idea can be formed as to the probable result of the next crops.

"It will be seen by the tabulated statement printed below that the world's visible supply on May 1st was the largest for many years past; the European total is smaller than last year, although, with this exception, the largest since 1895. The North American total, thanks to the Canadian quantity, is a very large one. Compared with April 1st there has been a decrease of only 265,000 quarters, against a decrease last year of 3,045,000 quarters. The average price of English wheat, 37s. 10d., was higher than in any previous year since 1895, with the exception of 1909, when it was 42s. 5d., and in 1898, when it was 38s. 4d.

THE WORLD'S VISIBLE WHEAT SUPPLY ON MAY 1ST.

	European	U.S.—Canada.	Total.	Eng. Average Price.
	Qrs.	Qrs.	Qrs.	s. d.
1912	10,960,000	12,565,000	23,525,000	37 10
1911	12,050,000	8,500,000	18,550,000	30 11
1910	10,160,000	5,935,000	16,045,000	33 0
1909	7,875,000	6,350,000	14,225,000	42 5
1908	9,485,000	5,035,000	14,520,000	31 6
1907	9,480,000	10,400,000	19,880,000	27 0
1906	9,375,000	7,360,000	16,725,000	29 6
1905	10,090,000	5,250,000	15,340,000	30 9
1904	9,780,000	5,925,000	15,705,000	27 8
1903	6,830,000	7,035,000	13,865,000	26 10
1902	8,570,000	7,300,000	15,870,000	29 0
1901	9,075,000	8,175,000	17,250,000	26 8
1900	8,390,000	9,710,000	18,100,000	26 0
1899	7,500,000	6,375,000	13,875,000	25 0
1898	7,500,000	4,260,000	11,760,000	38 4
1897	6,450,000	6,412,000	12,862,000	27 9
1896	7,195,000	10,450,000	17,645,000	25 8

Date.	LONDON (Previous Day).	ADELAIDE.	MELBOURNE.	SYDNEY.
	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.
May 8	Quiet; Liverpool steadily held, but not active	4/-	4/3 to 4/3½	4/2 to 4/3
9	Quiet; Liverpool dull with easier tendency	3/11 to 4/-	4/2 to 4/2½	4/2 to 4/2½
10	Steady, but quiet	Do.	4/3	4/2½
11	Steady, but quiet; Liverpool, steadily held, not active; Mar-April, 4/11½	Do.	Do.	4/2½ to 4/3
13	—	Do.	4/3 to 4/3½	4/3
14	Quiet; Liverpool quiet; off coast, 4/11½	Do.	Do.	Do.
15	Dull and offered lower	Do.	Do.	Do.
16	Dull, with easier tendency	4/-	4/3 to 4/3½	Do.
17	Quiet	Do.	Do.	Do.
18	Dull, with easier tendency	Do.	Do.	Do.
20	—	Do.	4/2½ to 4/3½	4/2 to 4/3
21	Very dull; Liverpool dull and neglected	Do.	Do.	Do.
22	No demand; Liverpool dull and neglected	3/11 to 4/-	Do.	4/3 to 4/3½
23	Steady, but quiet; off coast, 4/11½	Do.	4/2½ to 4/3	Do.
24	Steadily held, not active	Do.	4/3 to 4/3½	Do.
25	Steadily held, not active	Do.	4/2½ to 4/3	Do.
27	—	Do.	Do.	Do.
28	—	Do.	Do.	4/2½ to 4/3
29	Dull; Liverpool dull, easier tendency; Jan.-Feb., 4/10½	Do.	Do.	Do.
30	Steady, but quiet; off coast held for 4/11½	Do.	Do.	Do.
31	Steady, but quiet	Do.	4/2½	4/2½
June 1	Very dull	Do.	Do.	Do.
3	—	Do.	4/2 to 4/2½	Do.
4	Steady, but quiet; Liverpool steady, but quiet; off coast, buyers 4/11½	Do.	Do.	4/2 to 4/2½
5	Firmly held, off coast 4/11½; Liverpool steady, not a live...	4/-	Do.	Do.
6	Firm, Feb.-March, 4/11½; Liverpool firm, four cargoes off coast, 4/11½	Do.	Do.	Do.

STEAMER FREIGHTS.—(May 2nd)—Steamers from South Australia to United Kingdom-Continent, full cargo rates 32s. 6d. per ton (10½d. per bush.) nominal. Parcels, Port Adelaide to London-Liverpool or Continent, 25s. per ton (8d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SALTARE FREIGHTS.—From South Australia to United Kingdom-Continent, 30s. to 32s. 6d. per ton (9½d. to 10½d. per bush.); to South Africa, 25s. to 27s. 6d. per ton (8d. to 8½d. per bush.).

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on June 1st—

BUTTER.

Owing to the long continued spell of dry weather there has been a general shortage of cream, only a few districts having been able to keep up a regular supply. In consequence, the price of butter is higher for this period than it has been for a number of years. The present prices are :—Superfine, 1s. 5½d. ; pure creamery, 1s. 4½d.

A. W. Sandford & Co., Limited, report on June 1st—

BUTTER.—The long absence of rain caused a further decided shrinkage in supplies of butter and cream. Throughout the month, however, very active sales were experienced in all grades, with prices well sustained. Best factory and creamery, fresh in prints, sold at from 1s. 4d. to 1s. 5d. per pound ; choice separators and dairies, 1s. 2d. to 1s. 3d. ; store and collectors', 1s. ½d. to 1s. 1½d.

EGGS.—No doubt the dry season is responsible for the lessening in supplies, but the principal factor is the ever increasing demand for South Australian eggs, consequently higher figures have obtained than for a number of years. Prime guaranteed new-laid hen realised 1s. 8d. per doz. ; duck, 1s. 9d. ; ex cold store, 1s. 4d. ; pickled sorts, 1s. 2d.

CHEESE.—Stocks of South Australian makes are almost depleted, and as coupled with this a strong inquiry was experienced, rates sharply advanced until tall prices ruled. Quotations, 10d. to 11d. per pound.

BACON AND HAMS.—With the setting in of winter conditions the demand has lessened. However, as curers are not carrying heavy supplies of sides, middles, and hams, it is hoped that present quotations will maintain. Best factory-cured sides, 7½d. to 8½d. ; hams, 9d. to 10d.

HONEY.—Brisk sales have been effected, the trade operating spiritedly for all lines of choice flavored clear extracted. On the other hand, discolored and medium lots were slow. Values—Prime, 3d. to 3½d. ; secondary, 2d. to 2½d. ; beeswax, 1s. 2½d.

ALMONDS.—Export as also local inquiries have kept the rooms nicely cleared, resulting in prices being well sustained. Brandis, 6d. ; mixed soft-shells, 5½d. ; kernels, 1s. 2½d. per pound.

LIVE POULTRY.—A heavy month's business has been experienced, possibly the result of the shortage in fadders causing farmers to reduce the number of their birds. Meanwhile prices have well kept up for all coops of prime conditioned table sorts, the only dragging lines being consignments of light and weedy, which sold accordingly. Good table roosters fetched 2s. 9d. to 3s. 3d. each ; hens, 1s. 6d. to 2s. ; cockerels, 1s. 6d. to 2s. 6d. ; ducks, 2s. to 3s. 1d. ; geese, 4s. to 5s. ; pigeons, 6d. ; turkeys, 8½d. to 10½d. per pound live weight for prime ; poor and fattening sorts, 3½d. to 5d.

POTATOES.—The late or principal crop of Gambiers have practically supplied the market. Certainly some parcels from Victoria have come along, but as the standard of quality of Gambiers has been maintained a substantial month's business is recorded. Quotations—Gambiers, £5 5s to £6 15s. on trucks Mount Gambier, the latter being for specially prime samples.

ONIONS.—Decidedly higher average rates have ruled this season than for some time, and as stocks are exceptionally light the trend is towards firming values. Gambiers, £12 to £12 15s. per ton on trucks Mount Gambier.

CARCASS MEAT.—During the winter months consignments of carcass pork and veal are offered at the Friday markets, the trade operating on that day for their week-end requirements. Good brisk sales have ruled for all prime handy weights. Shop porkers weighing from 50lbs. to 90lbs. sold at 4½d. to 5½d. per pound ; nice baconers, 125lbs. to 140lbs., 4d. to 4½d. per pound ; medium, heavy, and rough sorts realised less money according to condition and quality. Prime dairy-fed veal without head and feet and pluck was in good demand and sold at 2d. to 3d. per pound ; medium and poor sorts, 1d. to 2d. per pound.

RAINFALL TABLE.

The following table shows the rainfall for May, 1912, at the undermentioned stations, also the average total rainfall for the first five months in the year, and the total for the five months of 1911 and 1912 respectively:—

Station.	For May, 1912.	Average to End May.	To End May, 1911.	To End May, 1912.	Station.	For May, 1912.	Average to End May.	To End May, 1911.	To End May, 1912.
Adelaide	0.84	7.12	4.55	3.80	Hamley Bridge	0.9	5.55	4.85	1.39
Hawker	—	3.94	2.77	2.17	Kapunda....	0.24	6.55	5.31	1.68
Craddock.....	—	3.70	2.41	1.40	Freeling.....	0.25	5.66	5.11	1.90
Wilson.....	—	3.90	1.99	2.80	Stockwell ...	0.20	6.10	6.43	2.07
Gordon	—	6.29	2.33	1.96	Nuriootpa ..	0.26	6.42	4.91	2.11
Quorn	0.1	4.44	2.51	4.12	Angaston ...	0.33	6.37	7.35	2.54
Port Augusta	0.5	3.77	3.90	2.30	Tanunda ...	0.33	6.89	8.18	3.63
Port Germain	0.14	4.77	4.39	1.42	Lyndoch ...	0.43	6.44	5.37	2.91
Port Pirie ...	0.12	4.79	5.76	1.17	Mallala	0.10	5.67	4.27	1.71
Crystal Brook	0.29	5.04	5.29	2.01	Roseworthy .	0.35	5.53	4.19	2.40
Pt. Broughton	0.52	4.81	5.22	3.16	Gawler.....	0.10	6.44	5.06	2.38
Bute	0.43	4.90	6.24	2.10	Smithfield ..	0.26	5.20	5.44	2.09
Hammond ..	—	3.84	5.46	1.49	Two Wells...	0.31	5.69	3.98	2.01
Bruce	0.1	2.81	2.05	1.90	Virginia.....	0.38	5.96	4.90	2.21
Wilmington .	0.13	5.90	5.82	3.50	Salisbury....	0.27	6.31	5.94	2.44
Melrose	0.27	7.57	6.39	2.96	Teatree Gully	0.87	8.82	6.33	3.86
Booleroo Cntr	0.12	5.02	3.28	1.50	Magill	0.83	8.47	6.22	3.87
Wirrabara...	0.28	5.94	4.15	2.01	Mitcham	0.65	7.53	5.69	2.40
Appila	0.18	4.99	4.66	1.39	Crafers.....	1.19	13.28	12.32	6.44
Laura	0.24	5.54	5.33	1.44	Clarendon ...	0.76	10.63	9.80	4.40
Caltowie	0.41	5.42	6.00	1.68	Morphett Vale	0.69	7.70	7.16	2.55
Jamestown ...	0.46	5.30	6.36	2.58	Noarlunga...	0.69	6.65	7.84	2.25
Gladstone ..	0.42	5.00	5.73	1.47	Willunga ...	0.80	8.28	10.60	3.59
Georgetown .	0.29	6.06	5.91	2.18	Aldinga	0.50	6.48	6.37	2.24
Narridy	0.26	5.67	4.88	1.83	Normanville.	0.49	6.67	6.10	2.25
Redhill	0.42	5.32	4.76	2.46	Yankalilla...	0.70	7.37	7.08	3.29
Koolunga ...	0.42	5.02	4.85	1.87	Eudunda.....	0.16	5.28	5.82	2.71
Carrieton...	—	3.90	3.20	1.34	Sutherlands ..	0.9	—	3.96	2.19
Eurelia	—	4.30	3.85	1.94	Truro	0.44	5.84	6.51	2.68
Johnsburg...	—	3.15	2.97	1.54	Palmer	0.20	—	4.55	1.93
Orroroo	0.2	4.77	3.10	1.84	Mt. Pleasant .	0.41	7.92	7.86	2.28
Black Rock ..	0.2	4.26	4.06	1.19	Blumberg	0.48	8.38	7.54	3.04
Petersburg ..	0.9	4.41	5.11	2.32	Gumeracha ..	0.83	9.71	9.29	4.03
Yongala	0.11	4.38	4.70	1.47	Lobethal ...	0.66	9.67	9.33	4.04
Terowie	0.15	4.30	5.04	1.75	Woodside ...	0.63	8.53	9.75	3.76
Yarowowie...	0.24	4.41	5.25	2.18	Hahndorf ...	0.83	9.63	12.81	3.63
Hallett	0.16	4.98	5.13	1.63	Nairne	0.60	8.51	12.92	3.35
Mount Bryan	0.31	4.43	4.94	1.87	Mount Barker	0.71	9.27	11.77	3.39
Burra.....	0.34	5.62	6.09	1.97	Echunga	0.74	9.69	13.11	4.22
Snowtown....	0.24	5.11	3.56	2.45	Macclesfield..	0.68	8.53	11.13	3.56
Brinkworth...	0.44	4.54	5.05	1.63	Meadows	0.77	10.44	12.83	4.31
Blyth	0.44	5.52	4.80	2.29	Strathalbyn .	0.69	6.16	7.83	3.57
Clare	0.86	7.72	6.67	3.37	Callington ...	0.13	5.27	6.01	1.57
Mintaro Cntrl	0.42	6.37	6.70	2.18	Langhorne's B.	0.44	4.96	5.22	1.90
Watervale...	0.69	8.54	8.64	3.42	Milang	0.52	5.68	4.16	2.24
Auburn	0.29	7.82	7.75	2.84	Walleroo ...	0.29	5.05	5.28	2.54
Manoora	0.40	5.71	4.68	2.39	Kadina	0.42	5.62	4.84	2.75
Hoyleton....	0.35	6.28	6.38	1.31	Moonta	0.53	5.47	4.50	3.10
Balaklava...	0.13	5.73	6.00	1.57	Green's Plains	0.26	4.93	4.00	1.67
Pt. Wakefield	0.21	5.16	2.27	2.15	Maitland	0.66	6.56	6.91	2.72
Saddleworth	0.16	6.75	5.06	2.19	Ardrossan ..	0.17	4.62	4.91	2.66
Marrabel ...	0.16	6.14	4.17	1.57	Pt. Victoria..	0.44	5.25	5.70	2.91
Riverton	0.21	6.70	6.10	1.94	Curramulka..	0.21	5.67	5.41	2.66
Tarlee	0.10	5.89	4.90	2.09	Minlaton ...	0.24	5.43	5.44	2.52
Stockport ...	0.14	5.20	3.94	1.88	Stansbury ..	0.50	5.40	5.94	3.33

RAINFALL TABLE—*continued.*

Station.	For May, 1912.	Average to End May.	To End May, 1911.	To End May, 1912.	Station.	For May, 1912.	Average to End May.	To End May, 1911.	To End May, 1912.
Warooka ...	0.39	5.40	7.24	2.78	Bordertown..	0.38	6.03	5.43	1.54
Yorke town ..	0.43	5.46	6.28	3.32	Wolseley ...	0.46	5.42	5.81	1.15
Edithburgh..	0.35	5.54	4.83	2.85	Frances	0.35	5.79	7.44	2.59
Fowler's Bay	1.11	4.28	3.20	3.09	Naracoorte ..	0.64	6.65	7.36	3.78
Streaky Bay.	0.45	4.79	5.80	2.35	Lucindale ...	0.65	6.65	7.43	4.41
Pt. Elliston..	0.37	4.60	4.86	2.63	Penola	1.21	8.16	9.91	7.38
Pt. Lincoln..	0.57	6.15	4.87	6.42	Millicent	1.54	9.07	12.53	6.97
Cowell	0.49	4.47	4.69	4.09	Mt. Gambier.	1.51	10.02	13.13	8.36
Queenscliffe..	0.48	5.85	—	3.79	Wellington...	0.32	5.25	5.09	1.66
Port Elliot...	0.62	6.85	5.88	3.60	Murray Brdg.	0.22	4.86	4.59	1.03
Goolwa	0.63	6.02	7.18	3.92	Mannum	0.6	4.34	2.74	1.04
Meningie ...	0.72	6.14	5.18	3.01	Morgan	0.1	3.33	4.16	1.66
Kingston	1.99	7.48	7.75	6.05	Overland Crnr.	—	4.17	6.21	1.06
Robe	0.94	7.47	9.25	4.68	Renmark	—	3.60	6.35	1.21
Beachport...	1.56	8.16	10.79	5.21	Lamerook	0.54	—	1.33	1.50
Coonalpyn...	0.49	5.35	5.16	2.20					



AGRICULTURAL BUREAU REPORTS.

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Appila-Yarrowie	†	—	—	Kingston	1208	29	27
Arden Vale & Wyacca	*	—	—	Koppio	†	27	25
Arthurlton	*	—	—	Kybybolite	*	27	25
Balaklava	*	—	—	Lameroo	1193	—	—
Beetaloo Valley	*	—	—	Leighton	*	—	—
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Bowmans	*	27	25	Lyndoch	1200	—	—
Bute	†	25	22	MacGillivray	1200	—	—
Butler	†	—	—	Maitland	*	6	4
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Port Pirie	1178	1	6	Wepowie	1173	—	—
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Salisbury	1186	4	2	Wirrabara	1175	—	—
Shannon	*	—	—	Wirrega	1212	—	—
Sherlock	*	—	—	Woodside	*	—	—
Stockport	*	28	26	Yabmana	1191	—	—
Strathalbyn	1205	24	22	Yadnarie	1191	29	27
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Tatiara	*	1	6	Yongala Vale	1179	29	27
Uraidla and Summert'n	1206	3	1	Yorketown	*	8	13
Utera Plains	1189	29	27				

* No report received during the month of May.

† Only formal business transacted at the last meeting.



THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT. (PETERSBURG AND NORTHWARD.)

Amyton, April 30.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. T. O'Donoghue (chair), T. Ward, T. Griffin, R. Brown, E. E. and S. H. Mills, W. and H. K. Gum, J. J. Cormack, S. Thomas, D. P. Aitken, A. Crisp (Hon. Sec.), and two visitors.

MIXED FARMING.—Mr. W. Gum read a paper on this subject. Wheat-growing, he said, was undoubtedly the farmer's principal source of income, but while this was so, it did not do to rely entirely on it in a district where the rainfall was light and uncertain. The prudent farmer would combine every branch of agriculture practicable in the district in which he lived, as one branch depended to a large extent on the others. If they did not grow wheat they could not store up food for their dairy herds, their young horses, their poultry, and their pigs, for dry years. One acre of wheat, with a good crop and a good price, was worth five acres of grass. They should fallow early and work their land well in the spring-time, and also after every rain in the summer, to conserve the moisture. By experimenting with the different wheats they could ascertain the variety which best suited their particular land. For seven years he had been experimenting with Viking and Federation wheats, and under equal conditions, he had found that Viking had given the best results every time. This variety had yielded from 1½ bush. to 8 bush. per acre more than other varieties. As a result of these experiments, he had decided to sow only Viking this year. This wheat was reared by the late Mr. J. King, of Georgetown. It was a very rapid grower, and therefore a good wheat to sow late. The rapid-growing wheat was the best for this district. Many good varieties were too slow. **Sheep.**—Sheep came next in importance. They destroyed all rubbish during fallowing time, and with sheep no feed was wasted. There was very little labor attached to them, and they kept the house well supplied with meat. Lamb-raising for the freezing works was the most important feature in connection with sheep. The best breed to keep was the Merino ewe, mated with either the Shropshire or Lincoln ram. The lambs of this cross developed much more quickly, and were heavier than the pure Merino lamb. No set time could be given for lambing, as that depended on the season. If there was plenty of green feed, the earlier the better. It was important to have small paddocks, and to change the sheep frequently from one to another. Four paddocks of 50 acres each, with a regular system of changing the sheep, would carry one-third more sheep than one paddock of 200 acres, and the sheep would also do much better. Frequent changing was most needed from the time the lambs were dropped until they were ready for the freezer. **Dairying.**—In dry districts like this, dairying would only pay for about four or five months in the year, owing principally to the lack of green feed in the summer months, and the long distances to travel for water. All bull calves should be killed as soon as they were dropped, as they did not pay to rear. Dairying in the northern districts had been paralysed by the disease among dairy herds. **Horse-breeding.**—This was a good paying line, and one to which

every farmer should give his attention. Mares should be mostly kept, for they reared foals, would work 10 months in the year, and would do as much work as a gelding, besides keeping up the supply of working horses. The best stallion procurable should be used, as it would pay best in the end. It was occasionally necessary to rear a light horse for light harness, but draught horses paid best. *Poultry*.—This industry was sometimes looked down upon as an unimportant one, but it helped to diminish the local store bill, besides keeping the banking account intact. Egg-production was the thing to be aimed for. If properly directed, children could do the necessary labor of attending to the fowls. *Pigs*.—Pigs should always be kept shut up, not in a close sty, but in a large pig-proof yard. They should be kept clean, and fed on good wholesome food. No flesh of any description should be given to them. When the pigs were killed, the bacon would then be of a solid wholesome nature. *The Garden*.—Every farmer should put aside a small portion of his farm for growing fruit trees. He could say this from his own 25 years' experience. In some years he had grown a lot of fruit, and in dry years little, but the sample which he had tabled at the meeting was a good proof that good fruit could be grown in the district. He had grown as fine a class of peach and apricot in some years as could be grown in the southern districts. Fruit could only be grown here under a system of irrigation by flood waters. The best kind of soil was a limestone rubble or porous subsoil. Clay subsoil was not good for fruit trees. The fruits best adapted for this district were peaches, apricots, plums, nectarines, quinces, and mulberries. In the discussion which followed, Mr. Brown favored rearing the bull calves instead of the heifer calves, because one could get just twice as much for them when they were two or three years old. Mr. Ward said that his experience had proved that the dairy paid better than ewes and lambs.

Coomooroo, May 15.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Berryman (chair), J. Brown, W. Robertson, E. Brice, R. and A. Polden, A. Toholke, M. Robertson, and two visitors.

SHEEP ON THE FARM.—Mr. W. Robertson initiated an interesting discussion on this subject. He thought every farmer should keep a few sheep as a means of increasing his income. He preferred dry sheep, as he thought lamb-raising was risky in this district. Mr. Berryman's opinion was that wheat-growing should be the farmers' first thought, and sheep second. He favored Merinos for this district, as they were the best wool producers, and did not give trouble by going through fences. He believed in keeping wethers, as there was always a sale for good mutton. He would not let sheep and horses run together in the same paddocks, as the sheep spoiled the feed to a certain extent. He would always give the horses and cattle the preference of the feed, as the sheep would do well where other stock would starve. He advised members to always buy young sheep off shears, and have nothing to do with old or wrinkly-necked sheep. Mr. R. Polden said sheep with clean points were generally the best to keep, as the wool was longer in staple and, as a rule, better in quality. Mr. Brown would not keep one flock of sheep too long, but have a change of blood occasionally. He thought that one sheep to four acres was all this district would carry. Mr. A. Polden gave his opinion that the wool was best when the sheep were three years old, after that it would deteriorate in quality.

Davenport, May 16.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Roberts (chair), Bothwell, Bice, Messenger, Gosden, Sanderson, Holdsworth, Lecky (Hon. Sec.).

WATER CONSERVATION.—The following paper was read by Mr. Gosden:—"Provisions made for water conservation by the State of South Australia compare favorably with those of any of her sister States. Despite the many good schemes carried out by the Hydraulic Engineering Department in the northern parts of our State, these have proved inadequate. Especially has this been the case in the district of Davenport (a district which gave promise at one time of a large and successful fruit industry) where insufficient water supply drove the producer from the land. Three producers who did not depend entirely on the water service remain to-day, and have not only produced the finest fruit grown in this State, but have also successfully competed in markets against all-comers. This alone proves the potentialities of the land under proper irrigation. At the same time

that many of our would-be producers were driven from the land, millions and millions of gallons of water rushed down the Saltia Creek only to find its destiny in the ocean. Owing largely to the immense watershed at Saltia this creek flows three or four times annually to Nectar Brook's once. During the first six or seven years after the construction of Nectar Brook reservoir the reservoir did not receive sufficient floodwater to reach the first outlet pipe, while Saltia Creek during one year of this period flowed no less than seven times, and on one occasion the flood reached 6ft. up the gum trees in the creek, and was 50yds. wide. This goes to show what immense volumes of water pour down this creek from time to time to do little more than waste, passing as it does through its only outlet between two hills of rock only 50yds. apart. Beneath the surface of the creek bed, some 20ft. or so in the deepest parts, a natural barrier of rock extends from hillside to hillside, forming a natural and effective barrier, and so far as one can judge perfectly impervious to water. This then naturally suggests itself as a possible site for a large reservoir at a moderate outlay. As to the holding nature of the bed of the creek everything points in its favor, as all the wells in this creek are full of good water, and one of our water supplies enters through a 6in. main at the very point suggested for the construction of a weir. The main is about 18ft. below the surface, and the bar of rock extends immediately under the outlet pipe. All waters therefore have to rise to this level before finding egress. At this point, also, the soil on top of the bar appears impervious to water. A retaining wall of clay has been constructed upon this and extends right across the creek, and is brought within 2ft. of the surface. Although the bed of the creek is of gravel and is stony in nature the water after rain lies on the surface for months without any further rainfall. Any water that soaks through the gravel is held by this retaining wall, and the water from here is the clearest and best in the district. It depends entirely on expert opinion as to any engineering difficulties that may present themselves, but to the casual observer there seems no great difficulty in carrying out a good water scheme. One thing certain, it never would lack for long sufficient water. If this scheme cannot be carried out, then the only alternative is to turn our attention to springs on the north of Saltia Creek. One of our late hydraulic engineers said a few years ago that his opinion was that there was more water in the springs of Thompson Gap, Depot Creek, and South's Creek than all the springs from which we are now drawing. If this is so, there is one thing necessary besides the laying of pipes to tap these springs. There are times of the season when we need more than a normal supply of water, and to meet this demand tanks for storage are absolutely necessary. Cement tanks, like the splendid arrangement of the Woolundunga service, would meet all the requirements. Open dams are not suitable owing to the poor holding ground if any depth is obtained; and the suggestion of shallow ones would never be entertained by our hydraulic engineers owing to loss by evaporation. The altitude of these springs would allow water to be conveyed by gravitation many miles west and north-west of Port Augusta. Seeing that manufacturers and producers have suffered in the past through an insufficient water supply, may we not reasonably expect history to repeat itself? With the expected influx of population in the near future and the construction of the Western Australian railway, further water conservation should then commend itself to our earnest consideration." A discussion followed, in which all members took part. The question was raised that, in the event of a further supply of water being necessary and the Saltia scheme, as outlined by the writer, being adopted, what route would be open to the railway to make room for the reservoir. One speaker was of opinion that if the scheme were adopted it would inflict an injustice on those who had gardens at Stirling and were dependent upon the floodwaters of Saltia Creek.

Dawson, April 27.

(Average annual rainfall, 10½in.)

PRESENT.—Messrs. E. W. Smart (chair), P. H. Baker, S. Smart, P. Quinn, C. Burden, T. R. Hughes, J. Nottle (Hon. Sec.).

HARROWING GROWING CROPS.—Mr. S. Smart, in initiating a discussion, said that he had tried harrowing his crops whilst they were growing during the past two years, but he did not intend to continue. He found that the results were better when he did not harrow after rain. Mr. Baker intended giving the practice a trial for a number of years. The Chairman fully believed in harrowing the crop. After a lengthy discussion the majority of members expressed views in favor of the use of the harrow on the growing crop.

Hawker, May 8.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. W. J. Pymar (chair), J. Palin, A. E. Feineler, A. J. Ireland, A. H. Rhymer, and J. H. Smith (Hon. Sec.).

IMPORT DUTY ON SUPER.—Members were of opinion that the rise in the price of super. which would follow the imposition of an import duty would be a serious matter to the farmer, and it was decided to oppose the proposal.

HORSE-BREEDING SOCIETY.—Mention was made of the fact that there was not a suitable draught stallion in the district, and members decided to move with the idea of forming a horse-breeding society.

Morchard, April 20.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. E. J. Kitto (chair) W. Toop, W. Reichstein, J. B. McDougall, H. A. Toop, R. Jasper, W. A. Toop, and B. S. McCallum (Hon. Sec.).

FALLOWING.—Mr. W. A. Toop read a short paper on "Fallowing." To get the best results from wheat-growing in this class of country, he said, the farmer must fallow all the land which was to be put under crop. Not only was this the case, but the best yields would be reaped from *early* fallow. It was a great mistake to be finishing fallowing when one ought to be hay cutting. He liked to get on to the fallow when the ground was as wet as he could work it, and finish all the ploughing by the end of August. Ploughing later than that usually ensured a lot of oats in the wheat crop. Early fallow could be worked down well, and a loose mulch kept on the top to keep the moisture in. He would harrow the fallows in September, and after each good rain. Mr. J. B. McDougall agreed with the views expressed in the paper. Mr. W. Reichstein thought it best to commence fallowing immediately after harvest.

Mount Remarkable, April 24.

(Average annual rainfall, 21 in.)

PRESENT.—Messrs. L. A. Bauer (chair), L. George, J. McIntosh, W. Foot, M. G. Giles, G. H. Goddard, W. Oldland, T. H. Casley, and H. H. Davis (Hon. Sec.).

IMPORTED SUPERPHOSPHATES.—Considerable discussion took place concerning a proposal recently made that an import duty should be imposed on superphosphates. A resolution was unanimously carried protesting that such action would seriously damage the producing industries of the State.

INFERTILE EGGS.—Mr. Giles exhibited some infertile eggs, which had lain in a dish since early in January. No preservative had been employed, yet, on examination, the members agreed that the eggs were quite suitable for cooking purposes.

WATER CONSERVATION SCHEME.—A discussion took place concerning the need for some adequate water supply for the district, and it was resolved to call a public meeting at Melrose to discuss the question.

Wepowie, April 30.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. C. Halliday (chair), C. Knauerhouse, C. Pearce, J. Crocker, G. Rooke, M. M. Irvine, W. Hetzel, J. and T. F. Orrock (Hon. Sec.), and two visitors.

IMPORT DUTY ON SUPER.—The following resolution was carried:—"That this Branch is strongly opposed to the suggestion to impose an import duty on manures."

STUBBLE-BURNING.—Members were of the opinion that March 1st was the most suitable date for stubble-burning in this district.

Wilmington, May 1.

(Average annual rainfall. 17½ in.)

PRESENT.—Messrs. J. Hannagan (chair), A. R. Gloede, Noll, Hill, Zimmermann, W., J., and G. Schuppan, and B. Jericho (Hon. Sec.).

IMPORTED SUPERPHOSPHATES.—Some considerable amount of discussion took place concerning a proposal to impose an import duty on superphosphates. A resolution was unanimously carried protesting against such an action.

STUBBLE-BURNING.—Discussion took place concerning a proposal to empower district councils to fix dates for stubble-burning. A resolution was passed agreeing with the proposal.

CARE OF FARM IMPLEMENTS.—A paper on this subject was read by Mr. A. R. Gloede. It was necessary, he said, for every farmer to take particular care of his implements. Sheds should be erected, and all implements, but more particularly those with woodwork, should be placed in them out of the weather. After using, all grease and dirt should be cleaned off. A note should be made in a book, kept specially for that purpose, of any parts that need repairing. If this were done, all that was necessary when again starting work was to screw up all the nuts and oil freely. All the woodwork of the implements should be occasionally painted.

Willowie, April 30.

PRESENT.—Messrs. T. Hawke (chair), A. W. Howard, S. C. Greig, D. S. and I. McCallum, B. E. Schmidt, A. and F. Gray, A. and J. Stone, W. P. Foulis (Hon. Sec.), and five visitors.

PICKLING WHEAT.—Mr. D. McCallum delivered an interesting address on the subject of the pickling of seed wheat. He referred to the method adopted on the Gawler Ranges 50 years ago, of using boiling water, and frequently using unslaked lime. The practice was to sow the wheat whilst it was still wet, the belief being that if sown dry it would not germinate. The average wheat yield of the State was 20,000,000 bush, and a loss of 1 lb. per bushel through smut would mean a monetary loss to the State of about £50,000. While pickling did not always entirely prevent smut, it would be found to greatly lessen it. It was not his practice in the early days to pickle wheat for dry sowing; but if the wheat were sown unpickled for a series of years the smut would appear. He had sown two strips of ground, situated side by side, one with the drill, and the other with the broadcast seed sower. The seed sown with the latter was free from smut, but the former crop had to be put through the winnower twice before it was marketable. He had also sown a plot of Gluyas alongside a plot of Marshall's No. 3 which had smut in it, but was pickled. The result was a loss of about one bag to the acre of the Gluyas on account of the smut, and there was also considerable difficulty in disposing of the wheat. The McCabe pickler was the most suitable; other methods would be found satisfactory if carried out carefully. It was essential that every grain should come into contact with the solution. Machinery in use at the present time crushed the smut balls and distributed the dust throughout the grain: hence the necessity of damping every seed with the pickle. Half a pound of bluestone to 4 bush. of wheat, and sufficient water to damp the whole, was strong enough for the solution. With the McCabe pickler he used 1 lb. of bluestone to 5 galls. of water, and this worked out to about the strength mentioned above. Three pounds were dissolved in 15 galls. of water at a time, so that an even strength was kept up. Where a stronger solution had been used it was found that the crop was thinner. With the McCabe pickler it was necessary to pour the wheat in slowly, so that all smut balls, oats, &c., rose to the surface and could be skimmed off. He did not think it wise to depend on the pickler to clean the grain. It was advisable to put it through twice, though it might take a little more time. He had had the McCabe pickler for two years, and had not been troubled with smut. When he pickled well he had a comparatively free crop. Last season he saw a crop which appeared good for four bags per acre, and which had to be cut for hay on account of smut. Smut in hay was not injurious. In dipping the bag the grains in the centre did not get wet. He did not find any difference in sowing wet or dry. He liked to go into the market knowing that he had a perfect sample of wheat. This could only be got by careful pickling. Members generally agreed that the McCabe method was the best, as by it the smut balls and rubbish could be removed. Mr. B. E. Schmidt said that if smutty seed were sown there would almost certainly be some smut in the crop. He preferred the McCabe, because it was easier and more effective, and acted almost as a grader. Mr. S. McCallum said each one must satisfy himself as to the best method and conditions. Some thought seed should be pickled a month before sowing.

He always pickled a short time before sowing. It paid to pickle, though it was not so necessary when sown dry. Mr. A. Stone strongly favored the method that allowed skimming. He would not pickle clean seed sown early and dry. It would pay to select seed. He did not altogether agree with the idea that machinery tended to increase the smut in a crop. Mr. S. C. Greig would always pickle wheat to be sown wet. Clean seed to be sown dry did not require pickling. He had found dipping the bag effective. He used 1lb. of bluestone to 5galls. of water. Mr. A. Gray thought the drill crushed the smut balls, and thus tended to make the crop dirty. Sprinkling was not satisfactory; as the smut got into the grooves of the grain and was not reached by the pickle. He used 8ozs. to 12ozs. of bluestone to the bag of wheat. He had tried washing the grain, but the result was not satisfactory. Mr. Hawke did not agree with the suggestion that the drill was responsible for smut in the crops. His experience was different from that of other members in this regard. Mr. Howard drew attention to the fact that when the grain was dipped in the bag there were minute air bubbles surrounding the grains, and enclosing smut spores. These prevented the free action of the pickle. Several members had noticed smut in self-sown crops; but this was attributed to the wheat having become contaminated in the harvester, and fallen out of this machine on to the ground.

Wirrabara, May 4.

Average annual rainfall, 30in.)

PRESENT.—Messrs. P. J. Curnow (chair), A. E. Stott, W. and W. H. Stevens, W. Bowman, C. H. Curnow, C. and G. Hollett, W. Marner, C. F. H. Borgas, A. R. Woodlands (Hon. Sec.), and one visitor.

ZANTE CURRANTS.—The following paper was read by the Chairman:—On the many industries followed in this State that of currant-growing has proved one of the most profitable during recent years. The climate suits the Zante currant vine, which flourishes in every part of South Australia, even in the drier districts where irrigation has to be resorted to. Our dry, humid atmosphere evidently provides conditions similar to those of Greece, of which the vine is a native, for, except in abnormal seasons, the fruit ripens regularly and during our best drying period of the year. South Australia owes it to Mr. W. C. Grasby (late of the *Garden and Field*) that currant-growing can be profitably carried on. Prior to the visit of this gentleman to Greece little was known of the 'ringing' process that now makes it possible to raise a payable crop. The land under cultivation to the Zante currant vine is rapidly increasing in acreage, and will continue to increase until the inevitable over-production takes place. The currant will grow on any kind of soil, but a good loam with a clay bottom is to be recommended. In the Wirrabara district this vine grows well in limestone soil, but will not live so long as on the former class of land. Where a good deep subsoil is available there is no reason to doubt that the currant vine, in spite of the cincturing process, which is said to shorten the life of the plant, should live to a considerable age. After selecting the soil, break it up to a good depth and then proceed to lay off the rows. On good land currant vines should be planted with not less than 13ft. between the plants and 10ft. between the rows; that is, where only one stem or cordon is used. On extra good soil, and where irrigation can be resorted to, 20ft. is a good distance. The writer favors the digging of holes 18in. square and down to the clay. After planting, cut the young vine back to two eyes; cultivate the soil well, and the subsequent season the leader should be cut back to a length of 9in. or a foot. With the third pruning the leader should be taken up to the wire and bent for a foot or so along it. The growth made during the previous season will regulate this. The fourth year the laterals can be cut back to two or three buds, and these can be allowed to fruit. The main limb along the wire should now be 5ft. or 6ft. long, and from now on should be encouraged to make good growth, which must be cut back every year only into good solid wood. The whole length of 20ft. should be reached by the sixth or seventh year. The first wire should be 2ft. from the ground and the top wire 1ft. 9in. above that. I do not favor ringing until after the fifth year from planting. Up to that age the vines should grow as much as possible. A check caused by too early ringing can do no good. The writer has tried three methods of ringing. When this system was first introduced it was recommended that a piece of bark a sixteenth of an inch in diameter should be cut out. This plan was followed for years, but I found, after lengthy experience, that such a wide cut caused the formation of two many 'bucks' or overgrown fruit, and the fruit did not ripen so evenly as when a very slight cut is made. Some seasons the bunches would ripen on one side, leaving the other side quite green. For several seasons past a

different method has been adopted. After the removal of the bark a large Saynor pruning knife is run right round the vine stem and is pushed into the green bark with slight pressure. Only one ring is made. This plan gives best results, as the sap is only slightly checked. Two years ago the single cut, being made spirally round the vine stem for a length of a foot or so, was tried; but this plan showed no improvement over the last, and meant more work. When the fruit is ripe do not pick bunches that are not black all over; half-green fruit dries a red color and is worth less on the market. In good weather currants will dry in three days. Do not over-dry. After removing the fruit from bunches (and the small grower does this by hand) rub it through a winnow sieve, breaking up all small sticks which will pass through a long mesh sieve, and finish picking by hand. After cleaning thus, put the currants in boxes to sweat. All fruit that is too dry will take up moisture from the others, thus an even sample is secured. A simple method of testing the dryness of fruit is as follows:—Take up a handful of currants, squeeze tightly in the hand. If all the fruit, while feeling moist, falls apart upon the hand being opened, it is just right; but if the handful remains bunched it must be dried further."

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Belalie North, April 27.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. P. J. O'Leary (chair), Arndt, P. Fox, W. Davey, W. Cummings (Hon. Sec.), and two visitors.

THE DAIRY COW.—A paper, written by Mrs. W. Cummings, was read by the Hon. Secretary. The opinion was expressed that there were good cows of practically every breed. Where a herd was to be kept for milking purposes only, however, the Alderney was the most profitable cow. A good food ration consisted of hay-chaff and wheat-chaff mixed and moistened with liquid molasses. A straw stack in the paddock was useful, as it provided shelter and a picking of food. After describing the type of animal to be recommended, the paper stated that a cow should not be out of profit for more than six or eight weeks. In drying-off it was advisable to milk once a day for three successive days, and then every other day for a week. Members generally concurred with the views expressed in the paper, and thought that proper shelter and judicious feeding were main factors in milk production.

Georgetown, May 5.

(Average annual rainfall, 18 in.)

PRESENT.—Messrs. P. T. Hill (chair), A. S. Inglis, A. Erickson, R. J. McDonald, M. J. McAuley, and S. Eyre (Hon. Sec.).

IMPORTED SUPERPHOSPHATES.—A resolution was unanimously carried protesting that the proposed import duty on superphosphates would seriously damage the producing industries of the State.

PREPARATION OF FARMERS' CLIPS FOR MARKET.—The following paper was read by Mr. A. S. Inglis:—"At the present time sheep are depasturing on a larger percentage of the small holdings in South Australia than has ever been the case before. Practically all the wool is sold in the local market. Unfortunately, however, for the farmer, this wool sometimes does not come to the market in very good order, and buyers view these carelessly-got-up clips with a certain amount of disfavor, almost amounting to prejudice. It may be taken for granted that the better a clip is prepared for market the greater the competition, and the higher the price per lb. secured. Many a clip is spoiled by the want of attention at shearing-time, and if proper attention is not given to skirting, classing,

and pressing, comparatively poor prices have to be accepted. The farmer immediately blames the selling broker for sacrificing his wool, and tries another broker the following year, with the same result. It would be better if he set to work to discover the true causes of the low prices. Very often the wool is bundled into bales as it comes off the sheep, bellies and pieces finding a place in the same bale, and the trouble is that only a certain section of the wool buyers can compete for these carelessly-got-up lots. It would pay the grower to carefully prepare his wool for the market. It is cheaper and easier to skirt and class both fleeces and pieces as the wool comes off the sheep's back than later on, when being prepared for manufacture. The buyer, in valuing, has to calculate the cost of sorting and separating before he can fix his valuation. The woolshed should be properly swept and cleaned before shearing commences. See that each sheep is evenly shorn, so that second cuts may be avoided; these are a loss, as usually they fall out among the locks and leave the rest of the staple so much shorter. When the fleece is off, it should be carefully gathered up and put on the roller's table, and should be trimmed and skirted. All that is necessary in the way of skirting, after removing the belly, is to slightly trim all shabby or sweaty pieces from off the edge of the fleece, so that the fleece is left looking clean and attractive. Do not mix bellies and pieces together. If there is not sufficient to make a bale of each, put them into one bale, and separate the two lots with a bag put in the middle of the bale with a marked line around the outside of the bale, to show where the division is. This is better than mixing the two sorts together. If a farmer cares to go to the trouble of making two classes, putting the brightest, well-grown, and lustrous wool for first lots, and throwing out for the second class all yellow, greasy, and dirty fleeces, it may pay well. The fleeces need to be packed well. Do not put too many in a bale, as the buyers may think it dirty if it is over a certain weight." Discussion was held over for next meeting.

Mount Bryan, May 6.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. J. Hatherly (chair), Wardle, Schmidt, E. K. Collins, Price, H. L. Hatherly (Hon. Sec.), and one visitor.

MIXED FARMING.—A paper on this subject was read by Mr. E. K. Collins. At the outset Mr. Collins warned farmers not to attach too much weight to other men's failures when contemplating the addition of some other side of farming to that already practised. Wheat could only be profitably grown by good farming, and many men dabbled a bit in other lines and failed to make them profitable through lack of thoroughness. For wheat-growing he would fallow in July to a depth of about 4½ in., according to the nature and depth of the soil. He would break the fallow down to clods of a medium size and let it lie till one or two good rains had fallen, and then cultivate it. He believed in plenty of working to secure a good tilth and to conserve moisture. He would commence seeding at the end of April, using a moderate solution of bluestone pickle, and sow 65 lbs. to 70 lbs. of good, graded seed. In red soil from 75 lbs. to 80 lbs. of super. was the best dressing, and in dark soil 45 lbs. was sufficient. In breeding horses the farmer should aim at the stamp of animal which was suitable for his work, and at the same time could be readily sold if desired. Both sire and dam must be sound. He favored the medium draught. Dairying in conjunction with other farming was a profitable undertaking, provided sufficient time was devoted to it and judgment exercised in breeding and feeding. No man should regard himself as a farmer who did not keep some sheep. These kept the weeds down and fattened themselves in the process. For market he favored the Merino-Shropshire cross. Pig breeding or raising was also a good line in mixed farming, as so much food was provided on the farm. Curing bacon and ham was also a profitable side line. Poultry-raising, both for eggs and table birds, was a most profitable undertaking, and turned one's spare time into money. Members generally agreed that it was a wise plan to practise mixed farming wherever possible.

Narridy, May 11.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. P. H. Smart (chair), W. R., J. E., and E. Lang, W. F. and H. H. Nicholls, J. Nicholson, J. C. Reinke, R. H. Satchell, A. Liddle, P. Haren, J. Darley, jun., M. Reynolds, T. H. Dansford, J. J. Kelly (Hon. Sec.).

IMPORTED SUPERPHOSPHATES.—Members opposed the suggestion to impose an import duty on superphosphates, as being against the interests of the producers.

COUNTRY CONFERENCES.—This Branch was of the opinion that it was advisable to continue the practice of holding conferences in different centres, as this enabled a greater number of producers to take advantage of the opportunity of hearing addresses and taking part in discussions on matters considered.

Port Germein, May 4.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Carmichael (chair), Head, Hackett, Hillam, Deer, Blesing, Crittenden, and Stock (Hon. Sec.).

MIXED FARMING.—Mr. Blesing contributed a short paper dealing with this subject. He expressed the view that where the whole of a farm was fit for cultivation the most profitable method of working was wheat-growing in conjunction with the keeping of a few sheep. Four years ago he tried sheep, after having wire-netted his holding and having made three miles of his fence dog-proof. Until the present season the results had been good, but since the beginning of the year the dogs had destroyed 50 sheep and had bitten and worried a considerable number more. His experience this year was that wheat-growing paid well, and bees had yielded a good profit on account of the prices ruling in the honey market; but, on the other hand, the returns from the garden were poor, and unless rain was experienced in the near future the results from the sheep would be a total failure. The subject was thoroughly discussed, and a resolution that the Government should be asked to bring in a Bill compelling district councils to pay for scalps obtained in their own districts, and that it be made a criminal action to bring any scalps but those of wild dogs; also that the Government should subsidise all payments made by the Vermin Board for scalps; and, further, that the Government should pay for all scalps obtained on unleased Crown lands, was passed.

Port Pirie, May 4.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. E. B. Welch (chair), T. Johns, H. G. Hawkins, D. McEwin, C. E. Birks, T. B. Jose, J. Greig, A. M. Laurie, E. J. Hector, J. Dick, and W. R. Wright (Hon. Sec.).

WESTERN AUSTRALIA.—An interesting paper dealing with his visit to Western Australia was read by Mr. T. B. Jose. Various matters referring to the land settlement policy of the sister State were touched upon, and reference was made to the system of wheat elevation in vogue in Fremantle.

ROTHAMSTEAD EXPERIMENTAL STATION.—Mr. E. J. Hector contributed a paper, in which he referred to his visit to the Rothamstead Experimental Station. The paper was well received.

IMPORT DUTY ON SUPER.—The suggested imposition of a duty on imported superphosphate was discussed at length by members, who were of the opinion that the proposal was distinctly against the interests of the producing class of Australia.

Redhill, May 14.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. F. Wheaton (chair), McAvaney, Cox, Coffey, Treloar, E. and B. Steele, Button, Dick, Holmes, Briggs, P. H. Wheaton, F. A. Wheaton (Hon. Sec.), and one visitor.

IMPORTED SUPERPHOSPHATES.—After some discussion it was decided that the Branch should oppose the suggested imposition of an import duty on superphosphates.

CARE OF IMPLEMENTS.—The following paper, read by Mr. E. Steele, was prepared by Messrs. E. and B. Steele:—"Every implement should have a shed, or a place in a shed, provided for it when not in use. Any machine that is left out in the weather for weeks at a time and exposed to heat and rain soon becomes weather worn. After an implement has done its season's work the owner should, when placing it in its proper place, see that it is in order. Take the combined harvester, which is of such great assistance to the farmer: This has many cogs and chains, and requires a great deal of atten-

tion. When the harvest is done it is advisable to remove all oil and grease from the machine, and if any parts are worn out they can easily be seen and replaced, in order that no delay may be occasioned when the machine is again required. The binder should be kept in the best of order, so that there is no delay at the hay-making season, as delay may allow the crop to ripen off and become of very little use for feeding purposes. After the hay-cutting is finished, the binder should be placed in the shed and the canvasses taken off and carefully folded up and placed in a cool place. During the winter it should be overhauled and all grease and oil removed. The seed drill has many cogs, mostly bevelled. It is advisable to raise one wheel off the ground and work it by hand to see if it runs freely before attaching the horses to it. Always carry a canvas to cover the machine at night. Such implements as ploughs, harrows, and cultivators, which are of iron and steel, do not need a shed; but a little paint put on them every two or three years will preserve them and keep them from rusting. It is advisable to see that all nuts are kept tight, as a loose nut will often cause a breakage. The most important item of all is the engine. This should be cleaned every time it is used in order to get the best results. All wagons, drays, and trollies should be kept out of the rain and heat, as they have much woodwork about them. They should be kept well painted, to prevent the wood rotting. All implement sheds should be built so that it is an easy matter to push the implement into them without the aid of horses." The paper was discussed at length, and members generally agreed with the views expressed by the writers.

Yongala Vale, April 27.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. C. Fowler (chair), J. Lloyd, T. Battersby, H. Menz, W. Edson, E. Fowler, E. Cooper, W. Scott, W. Keatley, T. Keatley, G. H. Jansen (Hon. Sec.), and three visitors.

AILMENTS OF HORSES.—Mr. Bladen gave an address on "Horse Complaints." He dealt with colic, and described the symptoms which were characteristic of the various forms of this complaint. This trouble was frequently brought on by the owner's negligence or carelessness. A veterinary surgeon should be sent for if the case seemed at all serious. It was better to prevent than to cure these troubles, and he advised regular hours of work and regularity in feeding. Horses should not be allowed to drink chilled water, such as well water, when they were overheated.

Yongala Vale, May 25.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. C. Fowler (chair), T. Battersby, F. Miller, F. Laubsch, T. Keatley, E. Fowler, B. Webb, G. H. Jansen (Hon. Sec.), and one visitor.

CLASSING FARMERS' CLIPS.—The following paper was read by Mr. T. Battersby:—"We are often told by wool experts how to class and prepare wool for market; but they generally deal with big lots of wool and not with the small lots such as the farmer has. It would not pay a farmer with only 100 or 200 sheep to go to the same trouble in classing his wool as the man who has 500 or 1,000 sheep to shear. The man with the small lot of sheep would have too many small lots. If there are less than three or four bales of wool in a line, it is sold as a 'star' lot, and the price for this is below the general market rate. The small lots are often bought up by the local wool scourers, and as they have to make a profit they do not give as much for the wool as the big woolbuyer. Where the farmer's flock consists of less than 200 sheep very little classing is required. When the wool is shorn the fleece should be picked up and spread on the wool table. All that is needed is to trim or skirt off all the sweaty, dirty edges and stained wool on the tail part of the fleece. When the fleece is clean fold the sides over and roll it. Roll from the tail end, or from breech to shoulder. When ewes and wethers are shorn together the belly pieces may be put together, but all stained and wet pieces should be carefully taken from the belly wool of the wethers. Never put belly and other pieces together, as the pieces are worth more than the belly pieces. They may be put into the one bale, but both lots should be weighed and a piece of bagging put between them. The weight of each lot of pieces that is in the bale should be recorded. Care should be taken to see that straw and chaff do not get into the wool. This will often happen if you are shearing in a straw-roofed shed. All bales should be branded on the end and on one side also."

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Angaston, April 27.

(Average annual rainfall, 21½ in.)

PRESENT.—Messrs. Heggie (chair), Player, Sibley, Stevens, Giles, Dr. Cowan, Ball, Friend, Smith, Salter, E. S. Matthews (Hon. Sec.), and seven visitors.

THE QUESTION OF LABOR FOR RURAL INDUSTRIES.—Mr. E. S. Matthews read an able paper on this subject. Having touched upon many factors which led to scarcity of labor and dissatisfaction among employers and employes alike, the writer stated that in such a country as this no man ought to be out of work, and there should be very little friction anywhere. The paper then ran much as follows:—"The fault does not lie so much with our social conditions as with ourselves. A young man who starts in life sober, industrious, upright, and paying a due regard to his health, always has made and always will make a name for himself and a future for his old age. He will certainly have setbacks, but all things being equal he will succeed in life. I never knew a good employer, honest to his men, upright and consistent in his dealings with them, but what had upright and consistent men in his constant employ—men who would stand by him and defend his name to the last. Good men are always wanted. Good employers usually have good men working for them, though sometimes the good employe finds a poor master and the good master sometimes gets hold of a poor servant. It is the imperative duty of every employer to see that the employe is properly housed and is comfortable, if living on the property. In the past, in some places, anything was deemed good enough for the worker to sleep in, and no conveniences were allowed. This should not be; if a man labors satisfactorily for a master, that master should make things as comfortable for his servant as his necessity requires. Many sleeping places, both for male and female servants, now provided would not, I fear, pass a board of health inspection. Health officers are often very diligent in townships, but are sadly remiss in not visiting stations and farms. Much of the discontent which arises is due to the neglect of employers in the matter of housing and feeding their employes. Whilst workers in cities are charged with indulging in luxuries they can ill afford, the same cannot be said of those in the country. An old servant's declining days should be rendered comfortable as far as the employer's means will permit. This principle tells considerably upon the younger servants. If a passing swagman is employed, and he works satisfactorily, he should be treated as a man, for it often puts heart into him and helps him to a better life. The employer should be ever ready to acknowledge merit; it costs nothing. If a servant is worthy of an advance in wages it should be given without the necessity of application. Some employers are ever ready to see what is left undone, but seldom acknowledge the things that have been accomplished. A living wage should be paid by every employer; but it is hard to gauge what that wage is nowadays when the worker is looking for so many luxuries. Although wages are so much higher than they used to be, many workers are none the better off. Many employers are to-day feeling the pinch more than the servant. Money easily earned easily goes, and the money that is most appreciated is that which is hardest earned. To the man who can earn good wages, pay accordingly; to him who through no fault of his own cannot earn as much as another, pay for the work he can do; to the old extend indulgence; to the decap't justice; to the waster judicious severity; and to the indolent, a move on to another country. The employer should encourage his workers to rise in the social scale; he should give encouragement according to merit; distribute a bonus each year, if practicable, as an incentive to labor and industry. A due regard should be given to holidays, not merely the calendar holidays, but a time off each year. A desire for recreation, pleasure, and indulgence is evident, with a corresponding unwillingness towards industry, and this must tell against this young country in the near future. I fear that our system of education has much to do with this. It may fit us for industrial pursuits; but we are an agricultural and rural country after all. More labor is required in the country; more population is required—we need an energetic system of immigration and a higher birth-rate. Legislation may and does remove injustices; but the workers' salvation is a personal concern. Our social condition would be remedied if we did unto others as we would that others should do unto us. Capital is dependent upon labor, and labor is equally dependent upon capital, and where either side tries to override the other chaos ensues. Hand in hand these two great forces can make Australia a power in the world; this land will be rendered a heritage to be proud of if employer and employe can but recognise their duty the one to the other."

IMPORT DUTY ON SUPER.—Members opposed the suggestion that a duty should be imposed on imported superphosphate as detrimental to the best interests of the producing class.

Blyth, April 30.

PRESENT.—Messrs. A. L. McEwin (chair), Zweck, Buzacott, Schuster, Shepherd, A. A. and J. S. Schulze, W. and J. Pratt, M. Coleman, J. S. McEwin, Best, Clark, H. W. and W. O. Eime (Hon. Sec.).

SUPERPHOSPHATE.—The following paper was read by Mr. J. Pratt:—"Superphosphate, generally and popularly known as 'super,' now so widely used in Australia and elsewhere, is in reality phosphate rock chemically treated and crushed to suit the requirements and convenience of the farmer. The first direct use of phosphoric acid as an aid to agriculture was made hundreds of years ago in England in a simple manner. Animal bones were roughly crushed and placed in the ground in their raw state. Of course, before this the use of farmyard manures had been general; but crushed bones was the commencement of artificial manure manufacture. Very soon, as farmers noticed the good results obtained from the practice, the demand for bones outgrew the supply; but science stepped in to aid the farmer. It was known that so long as phosphoric acid was applied to the soil the form of it did not matter, and guano, fish bones, and refuse of a like nature were all eagerly sought. To the use of phosphate rock as a more reliable and cheaper substitute for animal bones, &c., was now a short step, science again clearing the way by showing how the acid contained in the rock could be made available by chemical treatment. The knowledge of the benefits gained by using superphosphate has so spread that at the present day it is probably only in the least progressive countries of the old world, and out-of-the-way parts of those countries, that the use of commercial fertilisers is not general. England, America, France, Germany, Italy, and Japan all use enormous quantities of their own manufacture, and it is a blessing that for generations at least no fear of a shortage of the essential rock need be entertained. We read that in America the use of fertilisers has grown so greatly that now the total use has left the hundred of thousands of tons mark, and climbed into millions. Even in South Australia the use of super. has increased just as wonderfully. In 1897, 3,000 tons were used in the colony, and in 1911, 91,500 tons trickled through the drills of this State. New South Wales, Victoria, and Western Australia also make extensive use of the same commodity. Superphosphate as delivered to the farmers is simply phosphate rock crushed and ground to the necessary degree of fineness, and treated with sulphuric acid in the process. This treatment is necessary, because without it the phosphoric acid would remain chemically bound up and unavailable for the young plant to feed upon. Sulphuric acid itself is not in any way a fertiliser, and unless mixed in the right proportions and manner might hinder, or even destroy the seed germination. It simply releases the phosphoric acid by its action upon the lime with which the phosphoric acid is combined in its raw state. The actual process of manufacture is very simple. The rock as it reaches the manufacturer is in all shapes and sizes, from scraps the weight of peas to large and heavy boulders. This is all crushed to a fine powder by powerful grinding and rolling machinery. To this powder is added a correctly-measured charge of sulphuric acid in liquid form. Considerable heat is generated, and the slushy mixture of ground rock and sulphuric acid is allowed to cool and dry in storage sheds till the time of its use by the farmer. Before delivery the powder (again dry, but not nearly so fine as before the admixture of the liquid acid) is sifted in order to prevent any lumps from reaching the drill. Experiments are, of course, continually carried on, and so eminent an authority upon the subject as Professor Lowrie has stated it as his opinion that the time will come when heavier and more complete applications of manure will be required to achieve the results now obtained by lesser quantities. Good results attended an experiment made at Cleve last season, where the use of a specially prepared fertiliser gave a yield of wheat 2½ bush. better than the ordinary brand of super. applied to the same land on the same day with a similar quantity of the same seed. It is interesting to compare the rate of application of super. per acre in this and other countries. Possibly at the present time the average application here per acre is about 80 lbs., and a dressing of 1½ cwt. is regarded as a very heavy one. On the other hand, on virgin and light soils the drills are sown for 30 lbs. or even less. In England and Scotland the application of super. also varies, being heavier in the north than in the south. Nothing need now be said to practical South Australian farmers with regard to the value of super. as an aid to agriculture. But the actual value of manuring in pounds, shillings, and pence, worked out from official statistics of wheat harvests, shows what an advantage to the whole community, and not the farmers alone, these fertilisers

have been. In 1896-97, before supers. were properly used in South Australia, the acreage, yield, and value were as follows:—Acreage, 1,693,045; return in bushels, 2,804,493; average yield per acre, 1-56bush; value at 3s. 9½d. per bushel, £531,676 15s. 11½d. In 1910-11, when the use of super. was general, the figures were—Acreage, 2,104,717; return in bushels, 24,344,740; average yield per acre, 11-57bush.; value at 3s. 9½d. per bushel, £4,615,356 19s. 2d." An interesting discussion followed the reading of the paper. The Wallaroo Phosphate Company had sent Mr. Coleman 1 ton each of two special wheat manures, and this was put on fallow under conditions similar to those obtaining in regard to the general crop. While there was apparently no difference throughout the crop when it was reaped, it was found that the areas dressed with the two special manures returned 4bush. to the acre above the return from the other portion. Mr. McEwin would not sow less than 1cwt. of super. to the acre, and preferred the high grade manure.

Clare, March 29.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. D. McKenzie (chair), F. S. Walker, H. Mayor, F. Keane, J. Dux, F. Pink, P. R. Pascoe, G. Victorsen, C. Scott, E. H. Kelly, M. L. Nolan, T. H. Maynard, A. Hill, B. Lloyd, J. H. Knappstein, J. Scales, P. H. Knappstein (Hon. Sec.), and two visitors.

PRUNING CURRANT VINES.—The following paper was read by Mr. A. Pycroft:—"Seven years ago I spur-pruned seven year old vines, leaving the spurs as nearly as possible 9in. apart. The crop returned was fair and the fruit ripened evenly. Next year I left the same number of spurs and four rods about 4ft. long on each vine, making the rods into hoop-shape and tying them to the main arm. When the time came for ringing I found the four rods that I had left were loaded with a good crop of very large fruit, and the spurs where the rods were hooped round had died nearly out and were in a poor condition for pruning the next year. When next pruning I cut right out all the spurs that were smothered by the hooped rods. This left only about half the number of spurs on the vine, and some of these spurs were 2ft. apart. I left a rod on every other one of the spurs and one spur connected with each rod cut back to one eye. These rods I pruned to a length of 2ft., leaving two very strong cane rods and the others much weaker. Instead of tying the rods around the main arm I turned them back short and ran them in the direction opposite to that in which the vine was running, pulled the rod well under the main arm, and tied it to the wire. The reason I tied the rod under the main arm was that when it grew and the fruit started to get a bit weighty on the new rod, it hung down well clear of the spurs and had a better chance of doing well. This is a good way of pruning to get a fair crop and good clean wood every year. A very easy way of keeping the vine in good order, and also of getting good new wood close to the main arm every year, is to take any vine with spurs 9in. to 15in. apart, spike and spur every other one according to the strength of the vines; cut the spike with eight or nine buds and the spurs to two eyes this year, and next year, where the spur and spike were, cut this spike out and cut the spur back to two eyes, and if there is another shoot out this to one eye. The reason for cutting the one to one eye is to have this spur the following year, and the one with the two eyes will come in for the spike. By doing this you can keep on the main arm and have new wood each year." Mr. P. H. Knappstein did not agree with the system of spur and spike pruning as advocated in the paper. He had found that only the top two or three buds on the spike sent out shoots, and that the bottom buds laid dormant. That meant that the fruit wood was situated too far away from the crown or arm of the vine. The spikes did not carry a good crop of fruit through only the top bud sending out shoots, and he preferred a rod bent sharply down at the base and trained in a horizontal position to the spike. Mr. Walker agreed with Mr. Knappstein with regard to the spike pruning, and said it was one of the laws of nature for only the top buds to send out shoots on a spike standing in an upright position, and he preferred the rod and spur system. Mr. Nolan pruned all his currants on the spur system alone, but favored having rods where the soil was good enough to warrant it. He was inclined to think that the system of pruning in vogue on the river settlements was the best. In this district it was the practice to keep the spurs as close as possible to the main arms, but on the river it was just the reverse. There they carried the spurs farther out from the main arm year after year in a horizontal position, and by that means it was possible for the sun to get at the fruit better to ripen it, and ripen it more evenly than was the case with the system of pruning carried on in

this district. The fruit would not be so liable to crack and rot on the vines after rain with the system adopted on the river settlements, as the air could get round it better and dry it quicker. Mr. Maynard found it was giving a currant vine too much to do to carry rods, and he favored spurring every shoot short and cutting nothing out to leaving rods. He had seen some excellent crops carried on vines pruned on the spike and spur system. In reply to a question as to how original currant vines compared with grafted vines with reference to the amount of fruit they bore, the writer stated that generally grafts were not so good.

Gawler River, April 27.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. A. J. Bray (chair), A. J. Davis, Richter, Leak, B. and J. Hillier, Rice, Winckle, Higgins, [Dunn, U. J., C. A., and A. M. Dawkins, F. Bray (Hon. Sec.), and two visitors.

ROTATION OF CROPS.—The following paper was read by Mr. A. M. Dawkins:—Experience in other countries has proved that by growing different kinds of crops in regular rotation definite results may be looked for. The advantages of a rotation are in that different plants take different proportions of plant food from the soil, and search for it in different ways. Some are deep-rooted and others shallow; some draw largely from the subsoil, and others from the soil and air. The narrow leaf plant takes more from the earth and less from the air than broad leaf plants, which draw largely on the atmosphere. The waste and decay of one crop forms the manurial food for the succeeding plants. Some varieties of plants, such as clovers, peas, and other legumes, store up food from the air in the soil, which is available for the succeeding crop. Other crops are valuable as restoring the fertility of the land, not in themselves, but because they are fed to live stock upon the land. When crops of the same kind are grown continuously on the same land they are more liable to be attacked by disease, both with insects and fungoid pests. Repeated cropping of the same kind causes the crop to lose vigor, to become weak and poor, and less able to withstand disease. The growing of a different crop takes away the food of the insects or fungus that affect the particular crop, and by the time the crop comes into rotation again the disease or insects have died out, or become so weak as to be practically harmless. Rotation of crop is more economical of manures, as different plants need different plant foods; so that by alternate cropping the drain on the soil is not so exhausting, some crops requiring more of one manure and others more of another. A well-arranged rotation improves the cultivation and cleans the land. Crops that need deep cultivation, as roots, mangolds, kale, potatoes, &c., open and loosen the soil, improve the drainage, allow better aeration, and the soil gets deeper and gives more room for the roots to work. The hoeing, both horse and hand, in crops like roots, peas, &c., clears the land very largely of weeds. No farm is complete without live stock, and where cattle and other stock are kept a variety of crop is advisable. The most typical rotation is the Norfolk or four-course rotation. First year wheat, second year roots (turnips, mangolds, cabbage, potatoes), third year barley, fourth year clover; and so it continues—wheat, roots, barley, clover. I doubt if there is any rotation better suited to maintain the fertility of the soil than the four-course rotation. The root crop needs deep and thorough cultivation, with heavy dressing of farmyard manure; roots, being gross feeders, can make more use of heavy bulky fertilisers than any other crop. Barley, following roots, is a shallow feeder, and is enabled to use the residue of manure put in for roots, which will have become incorporated in the soil, and is not so likely to cause rank and useless growth. The clover crop sweetens the land and enriches it with nitrogen from the air, and leaves it in a healthy condition for wheat. Unfortunately our climate in this district does not lend itself to this rotation very readily. It may be possible to grow a rotation; but can it be grown at a profit? This is a question that at once crosses the farmer's mind. The first thing that strikes the farmer from other lands is that in Australia we have no system of farming. In a new country the first to take up the land is the squatter, and he stocks the land with flocks and herds, and for a time it is the best thing to do; but as time moves on and population increases, the squatter has to go farther back and give place to the farmer or wheatgrower. But as land gets more valuable, and population thicker, it is necessary to get more from the land by intense culture and rotation of crops and keeping more stock. I take it we are now working up to that point. It was soon found that wheat year after year did not succeed; the practice of burning the stubble and cropping every year with wheat soon failed to produce payable crops. It then became

the practice to let the land lie out for a year and grow feed. This was followed by a system of fallowing, and to-day many farmers adopt a three-course rotation of feed, fallow, and wheat. Since the use of phosphates there is such a growth of trefoil, clover, &c., in the stubbles that it almost works out a natural clover crop, which makes the rotation work out wheat, clover, fallow; and for this district we cannot improve much on it, combined with the keeping of sheep and raising of early lambs. With the dairy farmer the growing of kale might take the place in a root rotation with vetches and tares in an ensilage crop. It is very noticeable during the last few years the number of hay stubbles that are cultivated and sown with some feed crops such as oats, rape, barley, &c. The disease of wheat commonly called takeall, a fungus on the root stem of the wheat plant, has caused many farmers to turn their attention to the growth of oats as a check to the disease and profit to themselves. Our market, labor, and climate conditions are so different from those of other countries that we must work out our own system and method of farming. What would be correct under other conditions in other countries would spell disaster in ours; but it will not be long before we have some definite system of rotation under which to work. The permanent experimental rotation plots under the care of Professor Perkins at Roseworthy will prove of great value in time to come as a guide and help to the farmers of the State." In the discussion which followed Mr. W. J. Dawkins said that although rotation of crops was all right in theory, in practice it had not been a success. He had tried peas, but they had been a failure, and the succeeding crop of wheat did not appear to have benefited to any extent. Mr. Davis spoke of the advantage of growing a crop of greenstuff and converting it into ensilage. He agreed with the Chairman as to the beneficial effect of a crop of peas upon a subsequent crop of wheat. Mr. A. M. Dawkins, in reply, stated that a kale crop was a good one for the dairy farmer. He would not recommend peas for this district.

Nantawarra, April 25.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. W. Greenshields, S. Sleep, E. J. Herbert, A. F. Herbert, R. P. Uppill, J. Sinclair, W. Smith, F. J. Sutton, T. Dixon, J. Nicholls, G. L. Tucker (Hon. Sec.), and one visitor.

SEEDING.—Mr. W. Smith read the following paper:—"As the seeding time is now coming close, one naturally wonders what quantity of super. and seed to use per acre. My opinion is that, for fallow land, the best results are obtained by dressing with from 100lbs. to 1cwt. of super., and sowing not less than 1bush. nor more than 70lbs. of wheat. The same quantity of manure could be applied to oats and barley, sowing about a bushel of each seed per acre. With wheat and barley I would recommend pickling the day before sowing in a solution of 1lb. of bluestone to 10galls. of water. Have a tub large enough to dip a full bag of wheat in at once. Allow it to remain submerged for about two minutes, or, if there are any bubbles rising to the surface, a little longer. When the bubbles cease you can be sure that the pickle has penetrated right throughout the bag. Drill as lightly as possible, especially when the soil is in a condition favorable to a good germination. If inclined to be a little dry, put the seed in a little deeper. A number of farmers use the pressure springs on their drills, thus increasing the draught without doing any good. My opinion is that the weight of the hoes is quite enough to bury the seed, so I always release the pressure springs, or drop them altogether. I find it makes a vast difference in the draught, and where there is any rubbish, it can be got through more easily without the pressure springs. To prepare a plot of fallow land for the drill, cultivate the soil only just deep enough to cut the weeds, and allow just enough soil to bury the seed. I do not favor harrowing close behind the drill, and this year I intend, if possible, to test harrowing the growing crop to see if the results warrant the practice."

MALLEE SHOOTS AND HAY SHEDS.—Mr. Smith stated that he had tried a good many methods of getting rid of mallee shoots, and found that shoots cut high with a bush hook received more of a check than those which had been cut off close to the stump with a grubber or an adze. It was a paying proposition to erect haysheds. Out of 40 tons of hay which had been standing three years all but 15 tons was ruined by rain having found access through the damage caused by mice. In the discussion which followed, Mr. E. J. Herbert did not favor dipping a whole bag of wheat when pickling, as the swelling of the grain resulted in the wheat in the middle of the bag getting very little of the solution. He favored dividing a bag of wheat and placing it in two bags. The wheat was then fairly loose, and a uniform pickling resulted. Mr. Sleep thought it better to cut mallee

shoots off close to the stump, as he had found that by this method they very soon diminished in number. He considered that the quantity of super. required depended very largely on the class of land under cultivation. He was under the impression that a moderate supply of super. proved just as effective as a more liberal dressing. Mr. Uppill had found that on light soil a liberal supply of super. had made a great difference. Mr. Sutton favored drilling lightly and harrowing close behind the drill. Mr. Smith, in answer to a question, said that he did not favor harrowing behind the drill, as it made the land too level. He thought a better germination resulted when the water was allowed to run into the marks made by the hoes of the drill.

IMPORT DUTY ON SUPER.—The following resolution was passed:—"That this Branch protests against the imposition of a duty on imported superphosphate."

Riverton, April 4.

(Average annual rainfall 20½ in.)

PRESENT.—Messrs. J. P. Schultz (chair), Hon. W. Hannaford, M.L.C., A. Kemp, E. H. R. Scholz, F. M. Kelly, R. Wilkinson, J. E. Kelly, and one visitor.

SEEDING OPERATIONS.—Mr. J. E. Kelly read a paper to the following effect:—At this time of the year every farmer should have his seed wheat and oats graded, and in good running order for the drill. The drills, he said, should be overhauled to avoid any undue hindrances during seeding. It was necessary to see that the cultivator and scarify harrows were set evenly and all of one depth, to ensure even working for the horses. The horses' collars should be attended to, so that the work might be as comfortable as possible for them. Those who left everything until the last moment, when they should be busily engaged in seeding, were hurrying through with their belated preparations. Their ungraded seed had to go in as it was, and when it germinated they wondered why it was not as thick as the crop that belonged to the neighboring farmer, who had carefully prepared his seed. They took their drills out of the shed with perhaps a box half full of manure, and instead of cleaning this out, they made a start, and the result was some broken cogs, twisted bars, or perhaps a break in the main axle. Such a man would take the cultivator or scarify harrows into the paddock with tines and shares pointing in all directions, and wondered why the implement did not work as it should, and how it was that his neighbor could do 18 or 20 acres a day without trouble, while he worked hard to get 10 or 12 acres done. Hard and fast rules could not be laid down concerning all the seeding operations, but most farmers preferred to wait for a rain before drilling, and if time permitted, they would wait seven or nine days after the rain in order to get some weeds up, and to kill them. Others, again, had a given date, and started seeding, wet or dry. In this district the latter end of April and May was the best time for seeding, although in some seasons good returns were secured from June seeding. He liked to get the seed-bed as near the surface as possible, from 1½ in. to 2½ in. At this depth the seed and plant had the benefit of all the light rains that might fall. The old style of pickling on a floor, and turning over several times, was the most effective, and also the hardest work. He followed that course until last year, when he tried dipping a butt of wheat into a cask. He found this easier, but not so effective in preventing smut. Some farmers pickled nearly all the seed before they started seeding, but he only pickled enough for a day or two at a time, particularly with fungusine. Those who pickled a long way ahead claimed that the wheat ran more freely and evenly through the drill, and this was a strong argument in its favor; but the question was whether seed pickled some time ahead was as free from smut, and whether the germination of the crop was affected.

Riverton, May 9.

(Average annual rainfall, 20½ in.)

PRESENT.—Messrs. H. A. Davis, J.P. (chair), Hon. W. Hannaford, M.L.C., J. P. Schultz, W. B. Davis, J. E. Kelly, J. W. Kelly, R. H. Cooper, Alf. Hannaford, W. Stacey, R. Wilkinson, J. Johnson, E. A. Gray, (Hon. Sec.), and one visitor.

HORSE DENTISTRY AND GENERAL CARE OF HORSES.—The following paper was read by Mr. J. P. Schultz:—"A number of owners think that a foal has teeth as soon as it is born, but this is not so. The fullgrown horse has 40 teeth, namely, 12 incisor (six on each jaw), four canine or bridle teeth, and 24 back teeth, six premolars and six molars on each jaw. A mare has only 36 teeth, the canines seldom being seen in mares. A foal's teeth generally appear about 10 or 12 days after birth, when the central incisor or front teeth make their appearance. When the foal is about six weeks old the corner milk incisors appear; the premolars come next, with the incisors following a little later. The teeth on the upper jaw always appear first and the lower ones are shed when the others are about fullgrown. A colt will shed his first incisor teeth when about 2½ years old, when they make room for a permanent pair. When these are about level the remaining milk incisors and one of the premolars on either jaw will have to make room for permanent teeth. At 3½ years the lateral incisor will go in the same way; also another set of premolars. Two other molars appear at about the same time. This is the cause of the complaint that a 3½ year old horse will do no more work than a 2½ year old. The molar is a permanent tooth. At 4½ years the corner incisors will give way to permanent teeth, likewise the third premolar from each jaw. The last molar also comes about this time, so that when the colt is about 5 years old all the teeth will be found to be about level. All horseowners should inspect their horses' mouths from time to time when they are shedding their teeth as if this is not done the young horse may have its mouth deformed for life, especially if the old teeth are not cast off freely. Horses should have plenty of long hay to chew in order to keep their teeth on an even grinding surface. Some people laugh at this idea, but speaking from personal experience the results have been eminently satisfactory. Another reason why farmers should inspect their stock is that one should see that the horses' mouths are free from grass seeds and barley spears. During the week I visited a stable where all the horses were suffering from the effects of these seeds, the result being a hindrance to the feeding, and also a torment to the horse."

Salisbury, May 7.

PRESENT.—Messrs. Moss (chair), Sayers, Laurie, J., E. V., and A. H. Harvey, Bagster, Tate, Frost, R. Whittlesea, Bexton, James, Shepherdson, Illman, Powell, Neal, Patterson, Hooper, Uilwin, Heddle, Baylis, and Jenkins (Hon. Sec.).

IMPORT DUTY ON SUPER.—Members were of the opinion that any attempt by manufacturers to have a duty imposed on superphosphates was inimical to the best interests of Australia as a whole, and was decidedly opposed to the interests of the farming community, and they emphatically protested against the proposal. It was suggested that a combined protest from all Branches of the Agricultural Bureau in the State should be forwarded to the Federal authorities should the necessity arise.

SEEDING.—Mr. Illman read the following paper:—"I am in favor of the practice of early fallowing, commencing, say, in the middle of June and ploughing at a uniform depth of about 5in. Land fallowed fairly early retains the moisture much better than that ploughed later in the season. It is advisable to cultivate to about the depth to which the ploughing has been done immediately after ploughing, and then allow the land to rest until after harvest. Too much cultivation, and especially that done in the dry weather, is of no value, unless it is necessary for the purpose of destroying weeds. Do not roll the land until after the first rains, as dry rolling causes it to powder and set very hard, but if rolled after the rain it breaks up much better and remains looser. If time permits, cultivate again before seeding. Besides killing any weeds that may have sprung up, it will be found that the crop comes up more evenly afterwards. Providing that the necessary rain falls, the best time to begin sowing is in the middle of April. As the season promises to be late, it is not advisable to sow too many late wheats, and those that are sown should be put in first. I favor sowing both early and late wheats, and generally have a fair average crop each year. As this is a hay district the most suitable wheats are Baroota Wonder, White Tuscan, Majestic, Marshall's No. 3, and King's Early. The best wheat to sow with oats is Marshall's No. 3, as when the oats are ready the wheat is still green, and when out this makes a splendid sample of hay. When sowing wheat and oats mixed it is best to put the seed in early, in the proportion of 1bush. of wheat to 1bush. of oats. Wheat by itself should be sown at the rate of 1½bush., with 90lbs. to 100lbs. of superphosphate per acre."

YORKE PENINSULA DISTRICT. (TO BUTE.)

Moonta, May 12.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. E. Nankivell (chair), W. B. Stacey, T. R. Luke, C. Nankivell, W. F. Orloff, J. M. Browning, H. and F. Nankivell, Jas. Cooper, and T. Laidlaw (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Farm Laborer's Blocks.—This Branch favored the Government setting aside blocks of land in new country for farm laborers. W. B. Stacey suggested that in all future surveys suitable blocks should be set aside to meet the requirements of farm laborers and other laborers. This would be the means of inducing laborers and their families to settle in new hundreds. They would be available in the busy times, such as seeding, hay harvest, and wheat harvest, and in the winter for road-making, &c.

MORE MANURE.—Mr. Jas. Cooper said Professor Lowrie advocated the application of heavier dressings of manures. He agreed with the Professor in so far as grasses were concerned, but not in regard to wheat. The Professor said that in the near future farmers would need to put in 200lbs. of super. to the acre in the case of a season like the last. Where 1cwt. of super. has been used to the acre the crops were not nearly as good as where 75lbs. to 80lbs. were used. He thought the land around this district, which was only in crop once in three years and then fallowed, would return big crops for years to come with the addition of less than 1cwt. of super. to the acre. Members agreed with Mr. Cooper in respect to land cropped once in three years, but thought that the idea of Professor Lowrie was that land continually under cultivation must get poorer.

Paskeville, April 30.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. J. P. Pontifex (chair), T. M. Forbes, T. H. Price, T. N. Brinkworth, R. S. Disher, W. G. Drewitt, J. H. Bussenschutt, J. Rundle, G. H. Baumann, A. Goodall, S. R. Price, R. D. Norris, W. Bussenschutt, C. E. Palm (Hon. Sec.).

QUESTIONS FROM CONGRESS FOR OPINION.—

Selling Cattle by Live Weight.—Members were of the opinion that the present method of selling cattle was quite satisfactory, and that there was no need for alteration.

Farm Laborers' Blocks.—The suggestion that the Government should survey small blocks in new hundreds for the purpose of providing holdings for farm laborers was not considered workable. It would be more beneficial if the employes were allowed paddocking for a cow and to keep a few fowls.

WESTERN DISTRICT.

Colton, May 11.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. H. Whitehead (chair), P. P. Kenny, L. Larwood, F. Shepard, R. Hull, M. D. Kenny, W. A. Barns, W. J. McBeath, and one visitor.

SHARE FARMING.—Mr. P. P. Kenny, in the course of a paper in which he instanced cases of successful and unsuccessful attempts at working farms on the share principle, said that in starting a share farm in dry mallee country the first thing for the owner of the land to do would be to lay out a certain amount in improvements. He should get a suitable man, or two brothers for preference, and give them a good trial. If water were scarce, a fair sized tank and a good tin shed which would provide catchment, would be necessary. A tin shed, the material for which would cost £50, would collect water with every light rain, and could be used for storing fodder. A small area of scrub should be cleared, fenced with barb wire and netting, and sown with oats. A small piece of ground with oats would

feed a team of bullocks or horses during September or October, when a couple of hundred acres of scrub could be rolled down. The owner of the land should pay to have this work done. A young man with little money could not do better than adopt the share system in order to get a start. The farmer with money could not get better interest for his capital than by putting it into share farming.

Coorabie, May 6.

PRESENT.—Messrs. C. T. Giles (chair), Riddle, Hardy, Attie, Fox, Evans, Cousins, Underwood, Hobbs, C. B. Atkins (Hon. Sec.), two visitors.

IMPORTED SUPERPHOSPHATES.—Members indignantly protested against the proposal to impose any duty on imported manure, and considered that such action would be against the interests of the primary producers of the State.

STUBBLE-BURNING.—Members were in favor of the introduction of legislation empowering district councils to fix the dates for burning stubble to suit their own districts.

WHEATS FOR DISTRICT.—A discussion took place concerning wheats best suited to the district. Steinwedel was generally agreed to be the most suitable early wheat, although some members were of the opinion that Federation was equally as good.

Elbow Hill, April 27.

PRESENT.—Messrs. Cooper (chair), E. A. S. Wake, P. C. Dunn, A. Chilman, C. Jacobs, H. Wheeler, F. Wheeler, G. F. Wake (Hon. Sec.), and four visitors.

CONFERENCE OF WEST COAST BRANCHES.—Correspondence was received from the Utera Plains Branch in regard to this matter. It was decided that the month of August was the most suitable for the fixture, and the hope was expressed that some members of the Department of Agriculture should be present.

RED WORMS IN TANK.—The Hon. Secretary wished to know how to destroy red worms in tanks. He thought bluestone would be effective, but did not know the quantity to use. [Various strengths have been used with success. Where there are no fish which it is desired to keep alive, one part of bluestone may be added to 1,000,000 parts of water, i.e., 1lb. of bluestone to 100,000galls. of water. This will be quite harmless to both stock and human beings.—Ed.]

Green Patch, April 30.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. R. Sinclair (chair), J. Sinclair, sen. and jun., P. and G. Sinclair, Freeman, McFarlane, E. and R. Chapman, and Whillas (Hon. Sec.).

LIFE MEMBERSHIP.—At the last meeting of the Advisory Board Mr. E. M. Sage was approved as a life member of the Agricultural Bureau. Mr. Sage held the position of Hon. Secretary to this Branch for a number of years, and had previously held similar office in connection with the Balaklava Branch for a considerable period. During his connection with the Bureau he had always taken an active part in its working.

SEEDING OPERATIONS.—A general discussion took place regarding seeding operations in the district. The majority of members were this year sowing oats principally, as the wheat during the last two years had been so badly attacked by takeall. Algerian and Calcutta Cape were considered the most suitable varieties. Oats intended for hay could be dry sown, but this was not the case with wheat. When, however, this course was followed with oats, pickling was considered necessary.

Miltalie, April 27.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. J. P. Story (chair), I. W. and E. Story, P. G. Wilson, T. A. and A. M. Wilson, F. Jacobs, W. G. and E. P. Smith, F. F. Alm, A. R. S. Ramsey, W. E. Hier (Hon. Sec.), and one visitor.

FENCES, STOCK, AND IMPLEMENTS.—Mr. Wilson read a paper in which he stated that it was always advisable for farmers to erect durable fences when fencing. He would place the posts 9ft. apart, and have them about 3ft. 10in. in height. Two barbs and two plain

wires should be used. One barbed should be placed on the top of the posts, and one plain wire used to support the netting. Midway between these wires he would place the plain and barb wires. No. 8 wire was most suitable for tying the netting, as it did not easily rust through. This would be a good fence for keeping out stock and rabbits. Only the best stock should be bred from. When breeding foals they should be kept with the mares until they were five or six months old, and then placed in a yard and given plenty of chaff and $\frac{1}{2}$ gall. of oats daily until there was feed in the paddock in plenty. Implements should not be left out in the weather, but should be placed in a shed. It did not take much trouble to run them in after use, and machinery was too costly to neglect. As a general rule it would be found that the more the land was worked the better would be the returns. He would harrow his land after every rain in order to conserve the moisture.

Penong, May 11.

(Average annual rainfall, 12 $\frac{1}{2}$ in.)

PRESENT.—Messrs. Sanders (chair), Prider, Pearson, Jones, Krieg, G. H., J. B., and J. Oats (Hon. Sec.), and one visitor.

THE HARVEST.—An interesting discussion relating to various points in connection with the harvest took place. In reply to a question as to whether Federation wheat was deteriorating, the Chairman said that this variety went off if it were sown too often on the same ground. Steinwedel also had failed to keep up to the standard, and did not stool well. He was of the opinion that Gluyas was likely to come into favor more. Messrs. G. H. Oats and E. Jones had both received satisfactory returns from Federation. The Hon. Secretary was growing Federation for his main crop, as it generally yielded better than other varieties. There seemed to be a slight change in the variety; the heads were longer, and the grain also seemed to be slightly longer than when it first came in, and the color of head was not quite the same. It had yielded well during the past season, being, with Walker's Early, the best of the varieties grown by him, and yielding 18 bush. to the acre. He had also grown Triumph, which promised well, and, being a coarse straw, should turn out a good cut of hay. The conditions were not so favorable as they were for Federation and Walker's Early, but this variety would suit this district if grown on fallow. It yielded 14 bush. to the acre. He also tried Firbank, having obtained the seed from Parafield. It did not come up to the varieties before named, but was very early. The crop did not stool to any great extent and was very rusty; but this did not affect the grain much, as it was fairly large, and weighed well. The yield was 10 bush. to the acre. It was his intention to try several new varieties this year, with the hope of finding an early variety suitable for the district. Early-maturing varieties seemed to suit this neighborhood better than the late.

Utera Plains, April 27.

(Average annual rainfall, 14 in.)

PRESENT.—Messrs. A. Ramsey (chair), A. and C. Venning, W. Gale, J. and M. Abrook, N. Guidera, F. Branrich, H. T. Hornhardt, P. Sinclair, H. G. Hornhardt, H. Hill, M. Hunt, C. C. Bilney, R. Hill (Hon. Sec.), and 11 visitors.

STUBBLE-BURNING.—Members were in favor of legislation empowering district councils to fix dates for stubble-burning within their respective districts.

CLEARING SCRUB.—An instructive paper upon this subject was read by Mr. M. Hunt. It was difficult to lay down any particular rule for breaking down scrub, although in his opinion logging was the best. It was much quicker than rolling or mullenising. It should be done in August or September, as the feed was generally good at about that time, and the scrub had plenty of time to dry. Further than this, the fire would catch the first growth of shoots, which would have made their appearance by burning time. After the scrub had dried enough to enable one to distinguish the springbacks from the broken scrub, it should be gone over carefully with an axe, and everything in the shape of green bushes and springbacks should be cut. When cut and dry they helped the fire instead of checking it. The fire-break was the next consideration. This should be cleared in cool weather if possible, and it should be burnt, as this made a much cleaner job of the rubbish than forking. It should be about a chain wide on the north side, and two or three chains wide on the south, east, and west, for a paddock of about 200 acres. The scrub should now be ready for the fire. He would start with the first north wind in February,

to give plenty of time for the picking up. The south side should be lit first and be given time to burn back, before lighting the north. This should not be attempted without four or five men being present, to prevent the fire from getting out of control. After a few hours it was advisable to go over and burn any patch that had escaped the fire. Picking was the next occupation, which should be done as soon as possible after the fire, as the exposed ground soon began to drift over the timber, making it a much more tedious job to pick up the sticks and put them in heaps. These also should be burnt as soon as possible, or the soil would drift over the heaps. These heaps should be packed as tightly as possible, with the large end facing the wind, so that the wind will carry the fire straight through them, thus saving a lot of second handling. Stumps should be cut down as close to the ground as possible. If the axe were sharpened or ground too thin it would either gap or turn its edge, as the stumps being in a half dry state often proved to be harder than the axe. Where a good burn could not be obtained, he found the Campbell scrub rake the best labor-saving implement. It was far better than the strain rake for the purpose, as it was so much stronger. It kept to the ground better, and did not let the rubbish pass under the teeth. It was necessary to go over and cut all high stumps, to prevent any long sticks that were being dragged by the rake from getting caught under protruding snags. When this was done properly the Campbell rake would do excellent work. The lifting or tipping apparatus of this implement was a splendid device and a simple one. A very lengthy discussion followed. Messrs. A. Venning, W. Gale, and P. Sinclair spoke in favor of the scrub rake. Mr. A. Venning mentioned the careless way in which some men built the heaps. They experienced much unnecessary trouble in burning them. Most of the members were in favor of burning the heaps as one went along, because if they were left unburned long after being built, a strong wind might cause the sand to drift on the heaps and make a good fire impossible.

QUESTIONS.—In reply to a question as to how much hay a ball of binder twine would tie, the Chairman said it depended on the variety of wheat as well as the length of the straw and the quantity of grain in the head. He thought Gluyas weighed much heavier than most varieties if cut under the same conditions. The Secretary said there were many things to take into consideration, and he thought that the amount would vary considerably. It depended upon how tight the sheaves were tied, where they were tied, and the size of the sheaf. The kind of twine used, also had to be considered, as some twine was thinner than others, and 11b. would contain several more feet. He was of opinion that the best twine was the cheapest. Tests at the Roseworthy College had shown that a ball of twine would tie on an average 2 tons 6cwt. of hay.

Utera Plains, May 28.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. A. Ramsay (chair), W. Gale, W. Stephens, J. and M. Abrook, H. T., T. C., and H. G. Hornhardt, W. Lee, P. Sinclair, G. Barber, G. C. Bilney, M. Hunt, H. Hill, F. H. Haywood, G. Brinsley, H. D. Rule, R. Hill (Hon. Sec.), and seven visitors.

FENCING.—The following paper was read by Mr. H. Hill:—"Amongst the various improvements on a farm the fence is one which should be very carefully constructed. The rabbit-proof fence is the type mostly in evidence in this district, and the measurements of a serviceable fence are 3ft. 6in. high, posts 12ft. apart, 40 posts to a strain, one barb and one plain wire, each 11in. apart, with 3ft. netting of 1½in. mesh. First of all, good substantial posts must be secured, of an average thickness of 5in.; strainers should not be less than 10in. thick. To save a lot of unnecessary work when erecting great care should be taken in the cutting. Every post should be cut off level on top. To peg out the line use pegs about a foot higher than the fence which is to be erected. It is not advisable to have less than two pegs behind the fence, because it is necessary to take a sight from both ways. When the line has been pegged out the fence may start sinking the holes; about one strain should be done first, and this completed in order to keep the work together. These holes should be 2ft. deep, and those for strainers not less than 3ft. All bends in the posts should be placed facing the one way. On no account should one post be higher than another. Corner posts should have two struts, but strainers in the line need only be strutted one way. The boring is one of the most important features of all. It is a very great mistake to bore small holes, because this makes it hard to draw the wire. They soon become filled with rubbish and cause the wires to corrode. A five-eighths hole is large enough to prevent this. No. 8 galvanized steel wire is very suitable for the bottom wire, and the barb should be placed on top of the post and should be fastened with No. 10 wire, as the smaller wire is not strong enough. It is not advisable

to have the wires too far apart, because stock may get their heads between them, and thus cause considerable damage to the fence. Netting of 1½ in. mesh should be used, as a large number of young rabbits get through the larger sizes. It should be buried 6 in. under the ground. A trench must be dug; this is generally done by means of a grub axe. The netting should be unrolled so that the buckle leans towards the fence when stood up. It should be tied in about three places between each post. It is not wise to pull the netting too tight, because it is easily pulled out of shape. If convenient, when filling in the trench, place bushes in it on the side from which the vermin may approach it." In discussing the paper Mr. A. Venning said he thought fences should have two barbed wires, the bottom one being of 14 x 3 gauge and placed about 2 in. above the wire netting. The gauge of the top wire should be 12 x 3. The Chairman thought the fences should be 4 ft. in height and 3 ft. 6 in. netting used. Where there were wallabies and kangaroos one plain wire should be placed half-way up the netting to strengthen it.

Yabmana, April 27.

PRESENT.—Messrs. J. N. McCallum (chair), F. A. Bienke, J. F. Robertson, A. Robertson, J. Y. Robertson, W. F. Schuman, L. G. Strother, W. W. Lindsay, H. P. McCallum, A. McCallum, and M. K. Frost (Hon. Sec.).

BEST SHEEP FOR DISTRICT.—The Hon. Secretary read the following paper:—"A farmer getting together a flock of sheep, especially if he has in view the idea of securing a profit, and not simply his supply of mutton for the use of the farm, should not be influenced by what anyone living outside the district may tell him, but should study his own circumstances and local conditions. In my opinion the pure-bred Merinos stand in the front rank, because in this district the meat supply very often overruns the demand, which is, at best, a varying quantity. Freights, &c., prohibit the farmer finding a market outside the district. Wool can always be sold, and the Merino must be admitted to be superior to any other breed as a wool producer. Sheep require almost constant attention, and it should be the aim of every owner, by the judicious selection of rams, to bring his flock up to a high standard. In the selection of a ram density of fleece should be looked for, and not length of staple. If the ewes are at all fine-woolled, the progeny will carry a heavy fleece of very fine staple. This class of wool weighs well, and always commands the highest price. This district is admirably adapted to the growing of fine wools, the hills being free from sand and dust. Once a year the flock should be rigorously culled, passing out any aged, or sheep showing signs of rough or coarse wool. Notice should also be taken of any ewes rearing lambs of a coarse or weedy nature. These should be marked off for killing, though they may be without blemish. When rearing sheep to carry a heavy fleece of wool you should not rear mutton sheep. A few years' experience in this district, where there are generally more sellers than buyers, will prove that the sheep which produces a fleece of high-priced wool will return the richest harvest to its owner." Members generally agreed with the ideas expressed in the paper.

Yadnarie, April 27.

PRESENT.—Messrs. A. Jericho (chair), L. H. Marston, J. A. Kruger, F. W. Jericho, C. B. Schubert, J. and F. Dreckow, A. Spriggs, R. B. Deer, R. Parkes, F. Stubing, C. J. W. Mowat, and visitors.

FEEDING AND HANDLING HORSES.—Mr. R. B. Deer read the following paper:—"Great care should be taken with horses. They should be watered three times and receive three feeds of chaff daily, with a feed of long hay at night. Too much corn may cause sores to break out on their shoulders. They should be groomed regularly every morning, and be kept in a warm roomy stable. Do not tie them up unless necessary, as it does not give them an opportunity to rest. Horses should not be put to hard work directly after resting, as their shoulders would be likely to scald. A separate collar should be kept for each horse. When a horse shows signs of sore shoulders, shift the hair in the collar from where the sore touches. This can be done with a sharpened piece of hard wood. It is a good plan to have a saddle on the farm when the collars get out of repair, so that they can be stuffed to fit the shoulders of the various horses. For farm work the medium draught horses are the best, as they stand more work than larger animals and have more pace. Keep two or three good mares and put them to a good horse. Let the foals run with the mothers for about six months and then lock them up in a warm roomy stable

and feed them, unless there is plenty of feed in the paddock. Young horses, if properly looked after, can be broken in when two years and six months old. Do not work them too hard at first: half of each day is sufficient for the first week. If the foal is very free, do not work it in a wagon where it will have any heavy pulling, as it is likely to strain itself. Roping foals is a better method than that of using a crush-pen when breaking them in, as the former teaches them to tie up. Foals should not be petted, as this may cause them to develop stubbornness. Keep plenty of medicines on hand where there is no veterinary surgeon, as a horse can often be saved if suitable drugs are available immediately. The medicines most advisable to keep are spirits of nitre, belladonna, aconite, Epsom salts, and laudanum." In the discussion which followed members generally agreed that hay, if green and of a sweet variety, would be relished by horses as a change. Crushed oats was preferred as a corn for mixing with chaff. Mr. F. W. Jericho favored the crush-pen for catching young horses, but members generally thought that a horse would quieten quicker if tied with a rope and allowed a certain amount of liberty. Opinions were divided as to the advisableness of keeping a sire where sufficient mares to warrant the expense were kept.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, April 26.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Venning (chair), Gurner, Hill, Wall, R. F. Venning, Williams, A. H. Fidge (Hon. Sec.), and two visitors.

THE TIME TO SOW.—Mr. H. Bone contributed a short paper on this subject. The best time to sow cereal crops, he said, was as soon as possible after the first rains. Where wheat was to be sown on new land and the rains were late, it would perhaps be advisable to sow dry during April and May, although he had reaped good crops from seed sown as late as the end of July. Members generally concurred in the opinion that May was the most suitable time to sow wheat in this district.

Forster, May 25.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. C. Hayman (chair), G., T., H., and J. Searle, C. Payne, F. Johns, W. Searle, W. J. Sears (Hon. Sec.), and two visitors.

BREEDING AND HANDLING HORSES.—The following paper was read by Mr. T. Searle:—"Every farmer, after getting his holding opened up, should breed horses, either to provide an extra team or to replace horses that are becoming aged. Nevertheless, a farmer is very foolish to breed more young stock than he can properly feed. Stock that are stunted in youth never make good horses. For this particular district for farm work a man owning two or three good handy mares should mate them to a stallion of about 16 hands in height, with a well-shaped and weighted body; legs not necessarily of the very heavy or shaggy nature, but weighty enough to carry a good body. The active, quick-stepping horse is the most suitable for our loose sandy land. Almost every man has his own way of handling horses. Some will run the youngsters into a crush-pen, rope them, push the winkers on with a stick without trying in the least to get the animals to come to friendly terms. The horse can be educated to a certain degree, and the younger this is begun the better the results as a rule. Get a horse to understand that you are a friend as well as a master and you will get more satisfaction from him than if treated roughly and cruelly. Some again must have a whip in their hand always. This is a practice with which I do not agree. The whip has a tendency to make a colt nervous, and should be used with great precaution with horses both old and young, for there are generally horses in a team that do not like the touch and sound of the whip. If used on the sluggish care should be taken not to worry the nervous horses in the team. I have seen men in awkward places—called stuck up—with their teams, and the first thing they think of using is the whip, when perhaps a

little thought and clearing of the wheels would do a lot more good. The whip is all right in its place when used with discretion. Some people will work their horses in harness that is not fit for a horse to wear." I do not mean to say that a man should always be buying new harness. With a little attention by way of lining, stuffing, and patching old harness can be made comfortable for the horse to wear. All harness should be well-oiled or greased. The horse is the mainstay of the farm, and it is the farmer's duty to see that it is well fed, well treated, and that the harness is in order so that the horse can work in comfort." In discussing the subject Mr. W. Searle said the most profitable age at which to sell horses was 6 or 7 years. By this time from three to four years' work would have been secured from them, and a guarantee could be given that the animal was good, which would considerably assist in selling. The majority of members agreed on this point.

Geranium, May 4.

PRESENT.—Messrs. W. Mitchell (chair), I. J. and W. J. Mitchell, Jacob, Reed, Leahy, Lang, Lithgow, Norton, W. and T. Hammond, Charlton, Wendelbourne, McAuliffe, Pannell (Hon. Sec.), and three visitors.

FARM MANAGEMENT.—Mr. C. Charlton read a paper on this subject, in which he stated that he considered it essential for every farmer to have a systematic method of keeping accounts of transactions of his farm. The farmer would then know which line paid him best. If a smaller number of acres were put under crop, and more careful attention given to this smaller area, larger yields would be produced, and obviously the expenses of upkeep would be reduced. The stump-jump plough was a more useful implement than the disc plough, as it worked the land more thoroughly and was better for removing roots. He would heap these roots in the paddock and burn them. Substantial fences would always merit the cost of erection. It was advisable to erect good warm stables for the horses as soon as possible, as these animals needed the utmost consideration. If housed in a warm stable they would eat less feed and keep in better condition. He had made a practice of running kerosine through the bearings of machines after their season's work. A very practical address was concluded with the advice, "Keep down the expenditure." In the discussion which followed members thought a system of careful account-keeping instilled "method" into farm work. Mr. Norton said that any farmer could manage books if care were taken to set them out in proper order. It was agreed that the disc plough was not quite what the farmers would like; but in new country it had to be used. It was bad policy to plough virgin land too deep. To get the best results from the use of stable manure it should be rolled in order to kill all foreign seeds and improve its chemical value.

Lameroo, March 30.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. J. Trowbridge (chair), Wray, Leckie, Ross, W. J. Trowbridge, R. B. Koch, Steer, A. J. A. Koch (Hon. Sec.), and visitors.

METHODS OF SOWING AND RESULTS OF 1911 CROP.—The following particulars concerning the various methods adopted by members in the growing of their last season's crops were given, including a statement of the results in each case:—

Mr. E. T. Wray had 30 acres of fallow under Bluey wheat for hay. The crop showed hardly any rust, and yielded an average of $1\frac{1}{2}$ tons per acre. Another plot of fallow, 70 acres in area, was sown after a good rain, part with Bluey and part with Yandilla King for grain. It was badly affected with rust, especially the Bluey; but in spite of that, the average yield of the fallow was good. A hundred acres of stubble land was ploughed and drilled with Bluey, Yandilla King, and Federation. Bluey was badly attacked by rust, and did not yield more than 4bush. per acre. Yandilla was rusty also, but not so bad as the former variety. It yielded at the rate of about 6bush. Federation was only slightly affected with rust, and yielded better than either of the foregoing. One hundred and sixty acres of new ground was put under Bud's Early and Federation. The Bud's Early did the better of the two, but had slightly better conditions, owing to a better scrub burn. The average yield on the new land was about 8bush. He concluded from this season's experience that wheat sown directly after rain was more liable to rust, and in future would sow rust-resisting varieties at such times. This season had shown the value of fallow. Had he had half as much land under wheat, and all of it on fallow, he would have reaped quite as much wheat. Part of his fallow he would judge yielded wheat at the rate of 15bush. per acre, but the other poor crops pulled his average for the farm down to 6bush. per acre. He used between 70lbs. and 80lbs. of super. per acre throughout.

The harrows were used behind the drill, and also the big harrows in places, but there was no difference, so far as could be seen at harvest time. One plot of wheat fed off till the end of September only yielded about 3bush. of grain to the acre.

Mr. W. J. Trowbridge had an average yield of 12bush. of oats to the acre from stubble land. Federation wheat on stubble ground gave only 4bush. per acre. Walker's Wonder wheat on fallow land gave 14bush. per acre, and the same variety on new land yielded 4bush. per acre. Grass land ploughed and sown with wheat gave 7bush. per acre. Super. was drilled in at the rate of 90lbs. per acre. The rainfall from seed time to harvest, according to a private gauge, was only 3½ in.

Mr. Marshall had Baroota Wonder sown in April with 100lbs. super., and cut a yield of 1 ton of hay per acre. On new land Bud's Early for grain averaged 4bush. per acre, while on similar land Golden Drop yielded 8bush. per acre. His average yield for season was 4bush. to 4½ bush. per acre.

Mr. R. B. Koch sowed Walker's Wonder dry on late fallow. He fed it off with sheep and horses until September. Average yield 23bush. per acre. He used lowt. super. and 60lbs. seed. Grass land ploughed up and sown with 1bush. Gluyas seed, with lowt. super., gave an average of 12bush. per acre.

Mr. E. J. Trowbridge had 80 acres of grass land ploughed in March, harrowed down in April, and sown. Result, 9bush. per acre; 100 acres of stubble land ploughed in March and sown in April resulted in a yield of 6bush. per acre; 40 acres oats sown in same paddock yielded 13bush. per acre; 90 acres fallowed July and August, 1910, drilled in May, 1911, gave a return of 14bush. per acre; 140 acres of new land ploughed and sown at the end of May and in the first week in June, resulted as follows:—Walker's Wonder, 7bush.; Golden Drop, 9bush.; Federation, 9bush.; Yandilla King, 6bush.

Another member had new land under wheat, the seeding not being done very well, and late at that, and reaped on an average 3bush. per acre. The wheat in the claypans was 4ft. high, and thick and well headed, while immediately around the plants were only 1ft. high, with no grain in the heads.

Mr. A. J. A. Koch started seeding on May 5th on fallow land ploughed in August, 1910, and harrowed only in March, 1911; harrowed twice and cultivated twice, drilled in from May 4th to 18th. Result, from 65 acres, 1½ tons to 1½ tons of hay per acre. The balance was reaped for grain, and represented the poorest part of the lot. Result, Yandilla King 13bush., and Marshall's 16bush. per acre. Stubble land ploughed from March 28th to April 29th, harrowed before and after drill, and drilled from May 18th to 21st with Yandilla King, Silver King, and Federation. Result, 7bush. per acre. Eighty-two acres stubble ploughed from April 29th to May 20th, sown with Federation and about 90lbs. super., from May 26th to June 2nd, harrowed before and after drill. Result, 7½ bush. Ninety acres Walker's Wonder on new land, poor burn, ploughed from May 30th to June 17th, harrowed before and after drill, 90lbs. to 100lbs. super., sown from June 14th to 21st. Result, barely 5bush. per acre.

Mr. Ross had Majestic on fallow, and cut approximately 2 tons of hay per acre. Federation yielded only 4bush. per acre. Yandilla King was badly affected with takeall. He considered Walker's Wonder and White Tuscan the best yielders. These averaged 12bush. per acre.

Lameroo, April 27.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. J. Trowbridge (chair), Ross, C. R. and F. W. Eime, Cameron, Mead, S. G. Trowbridge, Jericho, Needs, Batten, Blum, A. J. A. Koch (Hon. Sec.), and visitors.

IMPORTED SUPERPHOSPHATES.—Considerable discussion took place concerning a proposal recently made that an import duty should be imposed on superphosphates. A resolution was unanimously carried protesting that such action would seriously damage the producing industries of the State.

PADDY MELONS AND SCOTCH THISTLES.—Mr. F. W. Eime initiated a discussion on this subject. Paddy melons, he said, were poisonous, and grew at a time when the farmers were too busy to eradicate them. They grew practically all the summer months. Each melon contained a large number of seeds, and these were often spread about by being caught in the implements. Scotch thistles were harder to eradicate than paddy melons, as the seeds from this weed floated for miles. A good way to check them was to cut them down just before they came into seed. Mr. Blum said that in his experience Scotch thistles had been a great standby in dry seasons, as sheep wanted very little water when feeding on them. A greater danger existed in the Bathurst bur, many of which he had seen in this district.

Morgan, April 27.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. R. Wohling (chair), E. Hausler, J. Heppner, E. French, I. Pope, and H. Wohling (Hon. Sec.).

IMPORTED SUPERPHOSPHATES.—Considerable discussion occurred concerning a proposal recently made that a duty be placed on imported superphosphates. A resolution was unanimously carried protesting that such an action would seriously damage the producing industries of the State.

POISONING MICE.—Mr. Hausler said that an effective poison for mice, that were doing much damage in the stacks, was strychnine. He placed a few saucers of water, with strychnine added, near the stack, and in a few days found himself rid of the pest.

Pinnaroo, April 27.

PRESENT.—Messrs. B. L. Harfield (chair), J. Docking, F. H., P. J., and R. Edwards, R. N. Jones, W. A. and M. Kelly, H. Ledger, A. R. Noltenius, E. H. Parsons, W. Venning, M. Wilson, P. H. Jones (Hon. Sec.), and one visitor.

PLOUGHING v. CULTIVATING NEW MALLEE LAND.—Mr. P. J. Edwards read the following paper:—"Many farmers in this district consider the cultivator to be just as good as the plough for the first year on new land, but I am of the opinion that, taking one season with another, ploughing is the safer and better method. I know there are drawbacks, but the advantages gained easily outweigh them. I think it will be willingly conceded that ploughed land must more readily take in moisture and also retain it for a longer period than cultivated land. The plough, if handled properly, will cut all the land, and I have yet to see the cultivator which will do the same. It is generally recognised that mallee land in its virgin state is somewhat sour. If it is treated in the first instance with the plough, which turns the land over, thus exposing it to the influence of the atmosphere, it must tend to sweeten and render the soil in a much better condition for the growth of a crop than if the top of the ground is only lightly stirred. You have all no doubt observed the tens of thousands of fibrous roots and many larger ones which are torn out by the plough, and the comparative few disturbed by the cultivator. These roots being removed must weaken, to some extent at any rate, the growth of the mallee stumps, besides destroying practically all the broom, ti-tree, and other bushes in the paddock. From new land we all expect at least two crops in succession, and I think you will all agree that the land which has been ploughed will be in much better condition the following year, and more easily put in than that which has only been cultivated. So the benefit derived in this direction from ploughing is not only felt that season but also the next. The chief objections to ploughing are that it is slow work and a greater number of stumps are pulled up than by the cultivator. But is it not one of our chief aims in mallee country to get rid of the stumps? Then why not begin the first year? Every stump which is pulled out and carried off the land is one less for the harvesting implements to bump over and waste wheat. It also means one less bunch of shoots to contend with, and I am of the opinion that the paddock will grow so much more wheat, for although the crop will sometimes grow for a while on top of stumps, it reaches maturity only under most favorable conditions. When we consider the great number of stumps removed by the plough, this must mean a considerable increase in the yield, not only the first season, but also the following ones. If a good early burn is secured, my idea is to get one plough at least going, and if time permits, plough all new land, and we stand a better chance of reaping a good crop." Mr. Docking considered the plough better than the cultivator, but he had known the old-fashioned scarifier to do work which was an improvement on either of these two methods. Mr. Ledger expressed the view that as a means of saving labor and expense, which were of vital importance to the beginner, the use of the cultivator was to be recommended. Apart from the question of implements, however, he was of the opinion that more depended on a good stubble burn than some were inclined to think. Mr. F. H. Edwards recommended the plough. He was certain that in a series of years far better results would be obtained from a small area well sown than from a large area badly sown. Mr. Venning said that all depended on the state and condition of the land. Some cultivated lands showed just as good results as if ploughed. Mr. Kelly said that he had been unable to detect any difference between lands ploughed and lands cultivated.

MOISTURE IN FALLOW LAND.—Mr. Ledger tabled some wheat plants taken from a paddock which was ploughed in September and worked twice since. About a month ago

seed was drilled in for the coming season, and Mr. Ledger attributed the growth, which had attained a height of several inches, to the moisture conserved in the ground by fallowing.

STUBBLE-BURNING.—This matter was discussed, and it was agreed that this Branch was strongly in favor of an Act of Parliament giving power to district councils to regulate the dates of burning.

Pinnaroo, May 25.

PRESENT.—Messrs. B. L. Harfield (chair), R. Coade, F. H., P. J., and R. Edwards, H. Fewings, L. M. Ferguson, R. N. Jones, W. H., W. A., and M. Kelly, H. Ledger, C. Lee, M. McCabe, B. H. Nash, A. I. Reed, W. Venning, Geo. and W. Wilson, P. H. Jones (Hon. Sec.), and six visitors.

THE SYMPTOMS AND TREATMENT FOR SAND IN HORSES.—A discussion took place on this subject. Mr. Venning, in one instance when one of his horses was affected, had detected in the animal an unwillingness to work, and a dull appearance about the eyes; but it retained its readiness to eat. As a remedy, which so far he had used without failure, he would give a bottle of linseed oil. He said the following treatment had appeared in print:—Give a quart of new milk, and then turn the animal on its back and rub its stomach with a fork handle. Mr. McCabe reported that he had had stock which were slightly affected, and had obtained satisfactory results by feeding three or four times on steamed cocky chaff with just sufficient pollard added to ensure its being readily eaten. He would always adopt this method when there was the slightest suspicion of sand. Mr. F. H. Edwards said that the animal troubled with sand usually had a desire to rub its stomach. Where procurable, a quart of brewer's yeast should be given, and the animal then turned on its back and rolled. Mr. Ferguson favored pollard gruel, if given in time. The Chairman reported the death of a foal through stoppage, the primary cause of which was sand. He had learned, when too late to be of use, that a mixture of 2ozs. of chlorodyne and a tablespoonful of carbonate of ammonia was the best known remedy for stoppage.

Waikerie, April 29.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. C. Burroughs (chair), E. J. Burton, A. Lewis, F. G. Rogers, J. J. Odgers (Hon. Sec.), and one visitor.

VINE-PRUNING.—The question whether the early pruning of vines caused them to shoot any earlier was raised. Mr. F. G. Rogers stated that he had pruned some of his vines early, some in midseason, and some late, but had found that they all burst into leaf about the same time. Mr. A. Jones (a visitor) had noticed that some vines which he had pruned early had shoots on before others had started. Members, however, generally considered the bursting of buds depended on the season, irrespective of the time of pruning.

Waikerie, May 27.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. C. Burroughs (chair), J. Jones, A. Lewis, W. J. Green, S. Modistach, F. G. Rogers, J. J. Odgers (Hon. Sec.)

PLANTING NEW IRRIGATION LAND.—An article in the *Renmark Pioneer* on planting oranges led to a discussion on the subject of the best means of utilising new irrigation lands. The paper stated that orange production was increasing to such an extent that it was doubtful whether this crop would prove profitable. Mildura was capturing the Melbourne and Sydney markets, and it therefore meant that a substantial overseas market should be found. The prospects were not promising, specially as there were thousands of orange trees planted in the district still to come into bearing. Members considered Gordos were overplanted, and that the production of currants was fast overtaking consumption. The general impression was that for small orchards a variety of fruits would be most profitable.

THE SEASON.—Members reported that the season's prospects were very poor at present. Rain was badly needed; in fact, none had fallen for months. It was useless to sow crops at present and soon it would be too late.

Wilkawatt, April 27.

PRESENT.—Messrs. J. Ivett (chair), W. J., D. F., and D. Bowman, T. Sorrell, sen., J. W. and F. W. Altus, E. Wand, H. H. Brooker, T. Sorrell, A. V. Ivett, F. and B. Spackman, W. R. Neville, P. Gregurke, W. J. Tylor (Hon. Sec.), and six visitors.

PREVENTION BETTER THAN CURE.—The following paper was read by Mr. W. R. Neville:—"Horses are subject to many ailments, some of which can be prevented. The ailments I will speak of are bots, sand, and wheat in horses. (1) *Bots*.—When in the fly stage are very annoying, both to the horses and driver, as nothing is more worrying than to have your team throwing their heads about. I have found that to smear with carbolic oil daily will give the utmost satisfaction, as the fly will not venture near it, and all the trouble following the laying of the eggs will be avoided. (2) *Sand*.—I think it a good plan when turning horses into the paddock to put them there with a full stomach. If they are put in when ravenous they will pick very low, and are liable to get sand into them. (3) *Wheat in Horses*.—There are every year serious losses through horses having got to the seed wheat or wheat heap. In a good many instances seed wheat is left out in the paddock with a wire fence for protection, which, in my opinion, is not sufficient. I am a firm believer in a good shed for seed wheat, and if this is provided and the door kept securely fastened there will be no trouble from horses eating wheat."

HARROWING.—Mr. J. W. Altus read a paper on "The Effects of Harrowing," as follows:—"I believe the harrows should be used much more than they are in this district, as they are lighter in draught and pulverise the soil more than any other implement. This stirring of the soil liberates plant food and admits air. Keeping the surface loose also retards evaporation, which must always be considered an advantage in a part like this, where the rainfall is sometimes rather light. Harrowing should be done at least four times between fallowing the land and drilling in the seed. If it can be done oftener, so much the better will be the returns. My opinion is that land should be harrowed and cross harrowed often enough to allow the horses to tramp all over the soil, from fallowing till seeding time, thus causing the subsoil to be thoroughly packed down. This will give the best results. Directly the land is ploughed up it should be harrowed, in order that evaporation may be retarded, to break up any clods, pull up weeds which are not turned under, and also to pack down the subsoil by the weight of the harrows and the tramping of the horses. After cultivating in the spring time, which should not be done deeper than half the depth of ploughing, the harrows should again follow immediately, for the same reason as before. It is well to harrow it twice over at this stage if the weather and soil are damp, to be sure that all weeds are killed, and that the surface is kept loose. Then in seeding time, after the first rain, when it is again cultivated, it should be harrowed down before and after the drill. All grain which the drill may leave uncovered can so be buried. The top will be kept loose and open, and the subsoil be firmed down, which condition is very essential to the growth of a crop of wheat, and will also help to prevent takeall." The paper was freely discussed, and many questions asked. One member wished to know whether harrowing the wheat just after it had germinated would do any damage. Members thought not, and quoted instances in which they had harrowed when the wheat was just showing above ground without any apparent loss. It was generally agreed that harrows should be used more than they were.

Wilkawatt, May 25.

PRESENT.—Messrs. J. Ivett (chair), W. J., D. F., and D. Bowman, J. W., G. A., and F. W. Altus, C. Sorrell, T. Sorrell, A. V. Ivett, A. J. McAvaney, B. Spackman, W. R. and M. Neville, P. Gregurke, J. O'Shea, F. W. and M. H. Gasmier, R. Sinclair, B. Tylor, W. J. Tylor (Hon. Sec.), and two visitors.

SHARPENING PLOUGH SHARES.—A discussion was initiated on the subject of the best method of sharpening plate shares on stump jump ploughs. Members thought that shares should be sharpened from the face or front.

CARE AND TREATMENT OF FARM HORSES.—The following paper was read by Mr. T. Sorrell:—"The care of his horses should be the farmer's first consideration. They should have good food and a good iron stable with a gable roof, as it is cooler than a flat roof. Straw roofs are fairly warm in winter and cool in summer, but they require a fresh coat of straw nearly every year to keep the rain out, and they are more likely to catch fire. I prefer a long manger divided off into single stalls, so as to prevent one or two horses going from one end of the manger to the other picking out the best of the feed. I would give horses three feeds of chaff, with long hay at feed up time. The chaff should be cut $\frac{1}{2}$ in. long. If the hay is dry it is a good plan to damp it over night. Oats are the best feed I have used. I prefer whole oats for young horses. A little bran or molasses should be given with chaff. Molasses are better in winter; they harbor flies too much in summer. A horse should never have a collar put on when it has dry sweat on its shoulders. It is a good plan to brush the shoulders at dinner-time. The collars should always be taken off while the horses are feeding. You need not lose any time, as you

can start them feeding and then take their collars off. When starting to work horses after a spell, they should be eased the first few days, as their shoulders are always tender. Every farmer should breed one or two foals every year, so as to replace the old horses. These should be broken in at the age of two and a half years or three years. Three years is the better time to break them in, as they are stronger and can stand work better. A young horse should never be put in with a jib, as it is easy to spoil a horse in this way." A good discussion followed. In reply to a question, Mr. Sorrell said he believed in letting his horses loose at nights. Horses did not do so well when tied up. Their legs often got stiff after hard work, through their not being able to get a little exercise. Some members thought that the horses would not agree, but others, who let their horses loose, stated that they would soon get used to it.

WINDBREAKS.—Mr. F. W. Gasmier read a paper as follows:—"The break reserves have been made to check the wind and thereby prevent sand drifts. These reserves are good for that purpose, but they will eventually become a nuisance, as they will be a harbor for rabbits and other pests, and in the course of time the mallee will be destroyed. The Government should hand these reserves over to the Forest Department, and the Forest Department should have them fenced and cleared, and then ploughed and planted with suitable profitable trees, such as gums, Remarkable pines, &c. The gums and Remarkable pines grow to a good height, and would make good windbreaks. If the Pinnaroo country were so planted it would be a great benefit. The gum trees could be used for posts, and the Remarkable pine for making boxes. Thereby the reserves would become profitable to the State. Now, to work this economically, as soon as the trees are, say, 6ft. or 7ft. high the reserves should be let free to the person whose land adjoins, to graze with small stock, such as sheep. Such persons should keep all fences in repair, and the Forest Department should find the material for repairs. The tenant should have the right to all dead timber for firewood, and also to what posts he might want for his own fencing. Any trees cut down for posts should be replanted by the Forest Department." A good discussion resulted.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, April 30.

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. S. Chapman (chair), T. Jacobs, sen., C. Ricks, J. Brumby, C. Lewis, H. Jacobs, J. Lewis, J. Midwater, E. Broadbent, A. Jacobs, H. Lewis, J. Tozer, A. R. Stone, T. Jacobs, jun., G. Hicks, A. Broadbent, S. H. Curnow (Hon. Sec.), and one visitor.

LIME-BURNING.—Mr. A. R. Stone read the following paper:—"So far as our immediate district is concerned one has not much opportunity of becoming acquainted with the actual process of burning lime. The first essential is to raise or quarry as much limestone as is required for a kiln, selecting stone that is not too soft or of a rotten nature, and of course also that which is not too hard. The moderately hard stone makes the best lime, provided it is well burnt. The site for the kiln should be on a slope. The place of burning is simply an excavation in the earth, of the desired size and depth, say on a small scale somewhere about 6ft. by 10ft., or 8ft. by 12ft., and 5ft. or 6ft. deep, as required. On the lower or bottom side of the kiln make an inlet, level with or even a little lower than the bottom itself, as a provision against the accumulation of water in rainy seasons, and also as a convenience in the working of the kiln. On the floor place a layer of wood (not too large, especially at the opening, which will be the place of lighting). Upon this layer of wood place the first layer of stone, which should not be broken too small, say to a size of about 4in. or even 6in. There may be even too much small rubble from this. If the stone is fairly soft, break it before placing it in the kiln; but if it is hard, it may be placed in on the wood and broken there, with little ill effects. Continue placing alternately as before, the wood and then the stone, to the desired quantity, completely covering each one with the other, till at last on the top place rather more wood than on the lower layers, and also much larger logs. Light at the bottom of the opening, which will need to be built up at once with stone, behind which should be placed a good thickness of earth, in order to retain the heat. Under favorable conditions of weather very little now remains to be done, if care has been exercised to avoid the fire being smothered with too much fine stone. An excessive supply of wood may result in the stone being melted instead of burnt. In somewhere about 24 hours, possibly less, the fire will be burnt out.

It may be necessary to floor the kiln and build the walls with stone to keep it clean. The above notes do not in any way refer to burning lime for commercial purposes."

FUSICLADIUM.—The following paper was contributed by the Hon. Secretary :—" *Fusicladium*, or black spot, is a serious fungus disease attacking both the apple and pear family. In districts favorable to its propagation it causes more serious mischief than perhaps any other pest with which the fruitgrowers have to contend. Not only does the disease disfigure the fruit, but in badly-attacked trees the growth is seriously retarded through the premature falling of the foliage. *Fusicladium dentriticum*, the fungus attacking the apple, seemingly thrives on all sorts of the kind. Some are, however, more liable to a virulent attack than are others. The Cleopatra is one of these; and one is safe in saying that in the hills many hundreds of these trees have been cut back and worked to more immune varieties. Of course there are years when the fruit is comparatively clean, but taken over a period of say 10 years, the trees are not profitable. Scabby fruit is useless for storing, and when put direct on the market brings in but a poor return. I find that in our own district the fruit will not set well on the Cleopatra unless a good bluestone mixture has been applied just before the blooms open. Two years ago I sprayed my Dunn's Seedlings with scalecide for the purpose of eradicating the red spider. I also applied it to the Cleos., as they are all growing next the former variety, and were more or less affected with the spider. As the preparation is recommended as a fungicide I trusted to it to check the ravages of the black spot; but for this purpose it was quite useless, and was not to be compared with the bluestone mixture, as was proved the same year by trees in the same orchard where Burgundy mixture had been used. I do not know of a more satisfactory mixture, in a district like this, than the Burgundy. The Bordeaux, of course, is recognised as being just as effective, but it is not always easy to get the fresh lime required. In mixing the Burgundy spray I use 5lbs. of bluestone and 7lbs. of washing soda to 50galls. of water for the first application, when the trees have first begun to show signs of movement in the spring. I reduce the strength to 4lbs. of bluestone for the second spray, to be applied with the first coat of arsenite of lead. *Fusicladium pyrinum* is the pear scab, and what has been said of the apple can be applied here also." In discussing the subject Mr. Ricks expressed the view that the development of black spot in apples was largely governed by soil conditions. Other members disagreed, and thought certain weather conditions favored the fungus.

Hartley, May 1.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. J. Hanton (chair), Brook, Brunes, Hudd, Pratt, G. Phillips, Hassum, Richardson, T. T. Phillips, Bermingham (Hon. Sec.)

THE VEGETABLE GARDEN.—Mr. Hanton read a paper to the following effect :—"Vegetables, he thought, like wheat and fruit, required to be carefully studied in order that the best returns might be got from them." The average farmer did not pay much attention to gardening, although at certain times of the year he grew a few vegetables. Quality and not quantity should be aimed at. He advised digging the garden immediately after the crop had been taken off. A light dressing of lime would be helpful, as it would destroy all insects and sweeten the soil. Cabbages should be planted in well-worked, heavy soil. When planting the roots should be hung straight down and the soil pressed into the roots with a peg run down the side of the plant. The cabbages should be planted in rows 2ft. apart, the plants being about 1ft. 6in. apart. They should be dressed with good strong manure, and also a weekly application of liquid manure should be given. For potatoes the soil should be dressed liberally with half rotted straw. They should be planted 5in. or 6in. deep, 1ft. 6in. between the rows, and 1ft. apart. When the stems turned yellow the tubers should be dug up. Parsnips could be planted with cabbages. Liquid manure should be used and the moisture allowed to penetrate the soil. Carrots should be planted in deep sandy soil, and when they were 4in. or 5in. high should be thinned out to about 5in. apart. Later, liquid manure should be applied. Turnips should be planted in sandy soil and given a dressing of old manure. Turnips should not be forced, as they were liable to become coarse. Nothing was better for turnips than a good hoeing.

Kanmantoo, May 27.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. W. Downing (chair), R. Talbot, S. Downing, E. Shepherd, R. Downing, H. Powell, R. Critchley, H. Pym, A. Hay, T. Critchley, J. A., and W. Mills (Hon. Sec.), and two visitors.

BEES.—Mr. E. W. Shepherd read a paper, in which he drew attention to the improvements which had been made in appliances used in connection with the bee-keeping industry during the past 20 years. Continuing, he said, "It should always be the beekeeper's aim to procure good honey, and to do this he must allow it to ripen in its natural place, viz., the hive, before extracting it. After being extracted and strained it should stand in a honey tank for a time so that the scum that has gone through the strainer can be skimmed off before tinning. The beginner should never attempt to commence bee keeping on a large scale. He should procure one or two hives and increase the number as he gains knowledge and experience. Start in the spring by purchasing a swarm or two as early in September as possible from hives which are known to have swarmed during the previous season. The queen of such a swarm would be in her second year—vigorous and in her prime. A beginner may judge the strength of a swarm by its weight, because it takes about 5,000 bees to weigh a pound. A swarm weighing 3lbs. is a medium swarm, and one weighing 5lbs. constitutes a good swarm. A stock should not swarm more than once or twice in a season, as every time it swarms it tends to weaken. After the issue of the first swarm with the old queen, if the hive is in good condition, a second swarm may be expected in about nine days. To have a swarm of bees that has just swarmed never use a smoker; but it is advisable to put on a veil. When bees have just swarmed they will very seldom sting if handled properly, because they are always loaded with honey. The main points are to have strong swarms and to always keep young queens which are in their prime for laying in the second season. After this the laying power decreases. During the height of the honey season, under favorable conditions a queen is able to lay from 2,000 to 3,000 eggs per day. The drones are the idlers of the hive, and their sole claim for existence is that they fertilise the young queens. Bees are subject to but few diseases compared with other creatures, dysentery and foul brood being the worst the beekeeper has to guard against. Of these foul brood is the most virulent, because it is a contagious disease, and will go right through and ruin an apiary in a very little time." An interesting discussion followed the reading of the paper. Some members were of the opinion that if a smoker were used when a swarm was to be taken the bees would fly away.

Longwood, April 27.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. W. Nicholls, E. J. Quinn; E. A. Glyde, J. Roebuck, A. F. Furniss, J. R. Coles (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—The meeting was held at the residence of Mr. J. Roebuck. The orchard and buildings were inspected and particular note was taken of Egyptian clover. The plants of this crop had roots of about 4in. before it showed above the ground, six days after it was sown. Five weeks after planting there was very little top growth, and the crop was far behind field peas of the same age.

IMPORT DUTY ON SUPER.—Members were unanimously of the opinion that the imposition of a duty on imported manures would be detrimental to the interests of the primary producer. It was pointed out that an additional charge against the cost of production of agricultural products would seriously handicap South Australia in competition with other lands.

STRAWBERRIES AND GOOSEBERRIES.—Some members were of the opinion that the cultivation of gooseberries was more profitable than strawberries, as the latter required to be hand-worked entirely. Mr. Coles intended planting strawberries on the septuple plan, so as to enable cultivation with the horsehoe being carried out.

Lyndoch, April 25.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), H. Klaube, H. Kennedy, H. and E. Springbett, E. J. R. Woolcock, H. W. Lawes, P. Burge, and J. S. Hammat (Hon. Sec.).

STUBBLE-BURNING.—Discussion took place concerning the proposal made by the Advisory Board to vest the district councils with the power of fixing dates for stubble-burning. Members were of the opinion that the dates at present fixed in this district were quite satisfactory.

MacGillivray, April 30.

PRESENT.—Messrs. R. Wheaton (chair), H. Ayers, A. Burfitt, J. Matthews, A. Stirling, sen., A. Stirling, jun., H. E. Williams (Hon. Sec.).

ROTATION OF CROPS.—The following paper on this subject was read by the Hon. Secretary:—"The efforts of some of the settlers on Kangaroo Island have heretofore

been confined almost entirely to the production of cereals. There now seems to be a growing realisation that, for the new hundreds to be profitably settled, other crops than those of wheat, barley, and oats must be added to the list. This means revolution for those men whose experience elsewhere has made synonymous the terms 'farming' and 'wheat-growing.' The adaptation to local conditions should be facilitated by observing the methods of working in the South-East country. An active interest in the work of the Bureau will further help us. One comparative disadvantage we are under is that of transport. With a distance of 20 to 35 miles to haul our produce, and this on bad roads, our scope of operations is somewhat limited. A scrub settler's first crop should be oats. He will thus secure feed for stock, and be enabled to kill the shoots with a stubble burn. Heavy manuring and seeding is advisable, i.e., 1½ cwt. bone super. and 2 bush. oats to the acre. A paddock sown with cocksfoot clover and perennial ryegrass, manured with 2 cwt. bonedust per acre, should be provided for stock. When feed is assured, attention may be given to the matter of rotation of crops. In treating this subject one authority says, *inter alia*, 'Rotation of crops economises the natural plant food of the soil, and also that which is applied in the form of manure and fertiliser. This is because crops take food from the soil in different amounts and different proportions. Rotation helps to maintain or improve the texture of the soil, because the amount of humus in the soil is maintained or increased by turning under green manure and cover crops, which should occur in every well-planned rotation. Rotation helps to maintain or increase the plant food in the surface soil. When crops like cow peas or clover, which take mineral food from the subsoil and nitrogen from the air, are ploughed under they give up the plant food in their leaves, stems, and upper roots to the surface soil, and thus help to maintain or increase fertility. Rotation tends to protect crops from injurious insects and diseases. It also helps to keep the soil free from weeds, and makes possible a more even distribution of labor throughout the year, while the farmer is able to provide for his stock more economically. Live stock fare better on a variety of food, which is more cheaply secured by a system of rotation than otherwise. A few general rules may be made use of in arranging the order of the crops in the rotation, though they cannot always be strictly followed. Crops that require the elements of plant food in the same proportion should not follow each other. Deep-rooted crops should alternate with shallow-rooted crops. Humus makers should alternate with humus wasters. Every well-arranged rotation should have at least one crop grown for its manurial effect on the soil, as a crop of cow peas, or one of clover, to be turned under. The objection often made to this last rule is that, aside from the increase in fertility, there is no direct return for the time, labor, and seed, and the land brings no crop for a year. It is not necessary to use the entire crop for green manuring—a part of it may be used for hay or for pasture with little loss of the manurial value of the crop, provided the manure from that part of the crop taken off is returned, and the part of the crop not removed is turned under.

Experiments have proved that one acre of cow peas, yielding 3,970-381b. of organic matter turned under gave to the soil 64-95lb. of nitrogen, 20-39lb. of phosphoric acid, and 110-56lb. of potash.' The beneficial effect of green manuring upon a succeeding crop of potatoes has convinced me of the value of this practice. On large areas, however, the legumes will perhaps be harvested or fed off. With a fairly heavy rainfall our lands might respond better to a system of cover crops instead of bare fallow, especially where light soils are concerned. If clovers, peas, and lucerne be grown in this connection, the need for artificial fertilisers will decrease; more stock will be carried, and of a better class; the quality of wool should improve, and new sources of revenue will be provided. Concentration on a small area with careful management of the various crops of roots, cereals, legumes, and grasses, may prove to be the best system for us to adopt in this district, where rainfall conditions are favorable; the uncultivated balance could be grazed." In the discussion which followed Mr. Stirling, sen., favored Calcutta or Algerian oats where a stubble burn was desired. The quantity of seed would vary according to the soil, from 1 bush. on poor and raw land, up to 2 bush. per acre on rich land. He thought that rape or some other green crop was preferable to bare fallow. Systematic rotation ought to be practised in this district. Mr. Wheaton thought it better to graze off green crops than to turn them under. He would seed oats up to 2 bush. per acre on good soils. He had noticed that sheep that had the run of bare fallow and maize and sorghum ate the wild oats growing on the fallow before touching the other growth, and then they ate the others down bare. A rotation likely to succeed well here was that known as the Norfolk, consisting of roots, oats or barley, legumes, and wheat. A system of crop rotation necessitated small paddocks.

DEEP PLOUGHING.—One member knew of a paddock losing its fertility through being ploughed deeply. It was agreed that the subsoil should never be turned up except by a gradual process.

DEPTH AND TIME OF SOWING.—Members favored shallow sowing. Half an inch would do if the seed was covered. Oats were best put in during May, wheat in June, and barley in August in this district.

DRY BIBLE.—A theory was advanced that this disease was caused by cattle eating the bones of rabbits which had been poisoned with phosphorus. Birds carried the bones to pastures where no rabbits were running. It was decided to ascertain whether the disease had ever appeared on the island, which is free from rabbits. [The Chief Inspector of Stock has reported as follows:—"It is very doubtful if the dried-up bones of rabbits which have died of phosphorus poisoning will poison cattle, or cause so-called dry bible (impaction of the omasum). Cattle have died as the result of eating the carcasses of rabbits with active phosphorised pollard still in them. Some have succumbed suddenly, while others have lingered for weeks. They gradually become too weak to get water, and, if opened after death, the omasum (bible) may, in many cases, be found dry; but this condition should not be confounded with impaction paralysis, which has carried off so many cattle on the mainland, and occurs where rabbits have never been poisoned. The bones of rabbits, or any other animal, which have died of strychnine poisoning are believed to be dangerous to cattle and sheep. The Stock Department has not received reports of deaths of cattle from so-called dry bible on Kangaroo Island."—Ed.]

Meadows, May 27.

(Average annual rainfall, 34½ in.)

PRESENT.—Messrs. G. Ellis (chair), J. Catt, T. B. Brooks, H. A. Kleemann, A. Ellis, G. T. Griggs, J. Stone, F. Nottage, W. Bertram (Hon. Sec.).

IMPROVEMENT OF BUREAU MEETINGS.—The Hon. Secretary read the following paper on this subject:—"Every member should be regular and punctual in his attendance, and should recognise his individual responsibility to contribute something towards the evening's work for the purpose of disseminating information regarding the working of the land. It should be the endeavor of each member to make the meetings a thorough success by taking his turn in preparing a paper or initiating a discussion on some subject of interest. Some members have an idea that their education in writing, spelling, and grammar might hold them up to ridicule if they attempted to carry out their obligations to the Bureau by writing a paper containing information gained by hard-earned practical experience. This idea is very erroneous and detrimental to the aims and the results of the Bureau. It does not require the primary school education to make a paper of this description valuable: it is the notes of actual experience in different experiments that make the paper valuable and instructive. The discussion and opinions of other members who are trying to produce a similar article under different conditions completes the attainment of the results sought. If this plan were adopted by members individually we would all have the opportunity of reading the views of scores of others engaged in pursuits similar to our own. The value of this interchange of ideas, experience, and observations to the individual members of the Bureau and to the State as a whole cannot be expressed, and the Branches are responsible for much of the success attending the scientific methods of farming adopted at the present time. The State agricultural advisers are also brought into touch with the producers through this medium. If we are to get good practical results from our meetings it is necessary to carry them out on absolute business lines. A member who writes a paper should give his subject careful thought and study, not put the matter off until the night previous to the meeting and then write the first thing that crosses his mind. When submitting a subject, if possible give your practical opinion gained by previous experience, and when the subject is before the meeting for discussion each member in turn could express his opinion. Homestead meetings should be held as often as possible, as members are able to obtain practical knowledge and to inspect crops, live stock, machinery, plant, &c., of all descriptions. The value of such excursions as these must be apparent to all. The host may seek advice from visitors and visitors gain many practical hints respecting farm appliances, as well as the larger problems of winning a livelihood from the soil. Homestead meetings are undoubtedly a great help to members who can see the various ways and means adopted by other members in working their holdings. Time could easily be found for the transaction of necessary business and for the social hour." In the discussion which followed the Chairman said that if members generally carried out the ideas of the Hon. Secretary there was no doubt that better results would be obtained.

THE MAN ON THE LAND.—Mr. G. T. Griggs contributed a paper, in which he detailed some of his experiences of farming. He stated that 45 years ago considerable trouble was experienced with opossums, and that on many occasions the crops which promised good returns were considerably hampered by hot winds. There were many difficulties

to contend with at the present time, and the prevailing opinion that the farmer had an easy life was not altogether correct. In the discussion that followed Mr. Jas. Stone said that although the opossums did considerable damage in the earlier days they were not numerous enough now to do much damage. The Chairman considered it necessary to protect them, otherwise they would become extinct. Mr. Griggs thought that the Government should reserve blocks of country in various districts in order to protect them if protection were desirable.

Meningie, May 4.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Scott (chair), Mincham, Hill, A. Ayres, Hiscock, Coad, Martin, Pettit, Tregilgas (Hon. Sec.), and one visitor.

A LONG MALLEE ROOT.—The Secretary stated that when sinking a well recently, he had found a mallee root which measured from top to bottom 42ft.

HORSE COMPLAINTS.—Mr. Hiscock had successfully treated a horse for sand by giving it flour and chaff, and drenching with flour and water for three weeks. Mr. Martin recommended the use of copra cake for worms. He was giving it to his horses and the worms were coming away from them very freely. He had tried unsuccessfully, tobacco, washing blue, worm powders, turpentine, and oil. Mr. Hiscock recommended one pint of milk and one tablespoonful of turpentine, and then Desmond's Worm Powders.

Morphett Vale, May 21.

(Average annual rainfall, 22½in.)

PRESENT.—Messrs. A. C. Pocock (chair), H. O'Sullivan, F. Rosenberg, E. Perry, T. Higgins, T. and A. Anderson, A. Connole, L. F. Christie, W. Goldsmith, H. V. Sprigg, E. E. Hunt (Hon. Sec.)

BREEDING FARM HORSES.—Mr. T. Higgins read a paper on this subject, in which he said farmers did not take enough interest in breeding farm horses. It cost as much to keep an inferior horse as it did to keep a good one, and therefore it would pay farmers to breed from good stock only. Just as much depended on the dam as on the sire. The main point was to see that the mare was perfectly sound in her limbs, because a good body was absolutely useless on bad legs. She should have flat bone, clean strong joints, and a long round barrel. A 12cwt. mare mated to a 15cwt. or 16cwt. sire should yield progeny heavy enough for farm work. The sire should have short legs, with flat bone, clean joints, and should be short from the knee to the fetlock, with plenty of good fine hair, a well-proportioned body, short couplings, and well-ribbed up with a round barrel and good shoulders. In the discussion which followed Mr. Connole said that a lot depended on how the legs were set in the hoofs of the horses. This showed how they could stand the work on the road. The Chairman said it was becoming customary to breed horses with flat bone and less hair. Members generally agreed that more care should be taken in the selection of sires.

Mount Pleasant, May 10.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. H. A. Giles (chair), T. C. Phillis, V. Tappscott, T. Thomson, D. C. Maxwell (Hon. Sec.).

ECHINUM ITALICUM.—Members agreed that, although this had not been proclaimed a noxious weed, they should do all in their power to prevent it spreading, and a resolution to the following effect was carried:—"That this Branch of the Bureau draw the attention of the district councils in the neighborhood to the desirability of taking steps to eradicate this weed."

STUBBLE-BURNING.—The Branch expressed an opinion in favor of legislation empowering district councils to fix dates for stubble-burning in their own districts.

STOCK REPORT.—It was reported that unless a downfall of rain was experienced shortly there would be considerable mortality among the stock in this district.

Narrung, April 27.

PRESENT.—Messrs. W. J. L. Thacker (chair), Sullivan, S. Bottrill, L. C. and S. L. H. Mann, Baker, Goode, Bolger, J. W. McNicol, Hackett, Williams, Critchley, Jas. Morgan, S. E. Morgan (Hon. Sec.), and one visitor.

THE PRODUCTION OF EGGS AND TABLE POULTRY.—The following paper was read by Mr. Williams:—"It is only within the last 12 years that the poultry industry in South

Australia, and in fact in all Australia, has made much headway. Up to that time farmers kept their flocks without knowing what money could be made out of eggs. On the farms the fowls lived on waste products and turned the waste grain into cash. There have always been a few who have purchased the whole of the feed and showed a fair profit, but it is only since the egg-laying competitions began that people have started to breed for egg production. To start poultry-keeping on a paying basis one needs to have a definite aim in view. If a man intends to supply table poultry he must begin with the breed that will mature quickly and give a good flavor of meat. Experience has taught us that a cross with a game male bird and any of these will give good results. The time has passed when the public ask for fully-matured birds with large frame. That is the reason why the Langshan is not so popular as it was 15 or 20 years ago. The bird that tops the market to-day is the half-grown, plump, and juicy one. Even the White Leghorn cockerels, if fed right, give a fair carcass at about four to five months old, and I have found that in the market they will return as much as birds 11 months old. It pays best, and in fact only pays when the cockerels are fed well and sent away from half to three-quarters grown. I have shipped a number of these to England through the Produce Department, but found I could do just as well by selling in the Adelaide market, or better still, to poulterers. To purchase feed at market rates for these cockerels would only allow a return of the outlay and the trouble. I have also sent birds to Melbourne, which, after being bled and drawn, would turn the scale at 10ozs, returned 1s. each, crated and on rail at Adelaide. The last order I received from there was for 1,000 poults, which I could not supply. To have success in table poultry one needs to be near the market and at the same time be able to grow or procure cheap feed. Some of the best fattening foods are maize, barley, peas, and pollard, with a little fat mixed in. *Breeding for Egg Production.*—In this line, too, careful selection of the breed must be made, but there must also be the *laying* strain in the breed. The laying competitions have shown us that while some White Leghorns were at the top of the list others were at the bottom, and this mainly due to the strain, but not altogether, for if you want a pullet to lay well you must feed for egg production from the time it leaves the shell. These must have just the right quantity and quality of food to build up a strong constitution and healthy organs for heavy egg production. At the same time one must ever keep in mind that fat is fatal to the laying habit. No livestock need such careful feeding and attention to the smallest details as laying hens. I have found that the best results are obtained by feeding mash consisting of one-third chaffed green feed, two-thirds bran and pollard, with a little meat meal or minced meat added in the morning. At midday I give as much chaffed green feed as the birds will consume, and in the evening grain—mostly wheat, white oats, and peas. *Yarding and Housing.*—This is a very important matter. Numbers of people have found poultry profitable to begin with, keeping up to about 30 head. They thought the flock could be increased and show the same return per head. It has been proved again and again, however, that the largest profits per head are from the small flocks. The best poultry house for this climate is made of galvanized iron, providing the fowls have other shade during the hot weather. The house should be free from draughts on three sides and open to the east or north-east in most localities in this State. A fair-sized house for a dozen birds would be about 8ft. long by 6ft. wide and 5ft. high in front, sloping to 4ft. 6in. at the back. The perches should be set all on the same level, not more than 18in. or 20in. from the floor and placed at one end of the house. The balance should be used as a scratching shed for holding straw about 9in. deep, in which all grain should be fed. This not only keeps the birds active but it works off the fat and also protects the grain from sparrows. By careful handling fowls will return 10s. per head above the cost of food, for market eggs."

Narrung, May 25.

PRESENT.—Messrs. Thacker (chair), Hackett, Richards, Bottrill, Bowyer, Critchley, Sullivan, L. C. and L. H. Mann, Jas. and S. E. Morgan (Hon. Sec.).

DISEASES IN PIGS.—Mr. Richards read various extracts with regard to different diseases to which the pig was subject. He stated that his pigs had been suffering from a lung complaint, but he had completely remedied the trouble by adding Stookholm tar to the food. Members expressed the view that pigs running at large were less likely to contract ailments than those confined in small sties.

DAIRYING.—The following paper was read by Mr. Jas. Morgan:—"The breeding of the dairy herd requires more careful attention than is given it by many people. Whilst a good bull is often purchased with the idea of improving the breed, sufficient care is not taken in selecting and testing the cows. This is a very important item. If the cows were properly tested the dairyman would be starting on a sound basis, provided the bull was from a good milking strain. In many cases the progeny does not receive the

attention it should. Calves are often put on to separator milk immediately from fresh milk. There is insufficient nourishment in separator milk without the addition of other food, and they do not thrive as they should. Frequently they are turned out without shelter, and to pick for themselves. Being delicate, they are not able to stand the cold, with the result that they receive a severe check and do not mature early. Any calves that are not to be reared for milkers should be fed on new milk until about three weeks old, and then sold. Calves intended for milking require to be fed even when turned out to graze. This would probably cost £3 or £4 per head, but would be money well invested. I prefer to have the bull shut by himself in a paddock. The cows can be put to him as desired, and the result would probably be a majority of heifers. In winter there is usually sufficient grass for grazing; but it is necessary to provide fodder when the paddocks are bare. If maize, sorghum, lucerne, or other grasses are grown, silos can be used to convert all surplus fodder into ensilage. The Scotch thistle, which is prevalent in the district, could be utilised in this way. The ensilage could be fed in the autumn or early winter until other feed had grown. A few acres of grass could be cultivated and fenced off. This proves useful when cut for hay. Barley should be sown early in the year. The cattle require shelter, more especially in winter, and a plantation of trees or shrubs in a central position in the paddock would provide this. A supply of good water should be provided for the stock, and arranged so they can have free access to it at any time. I consider the milking yards should be in the centre of the holding. If it became necessary to cultivate a portion of the block, this would be more convenient than having them near one end. In erecting cowsheds, where it is possible, build them of stone with iron roofs. This provides a more even temperature. The inside could be whitewashed, and should be kept perfectly clean. If the floors are of brick or concrete, with a drain at the rear of the stalls, there should be little trouble in keeping them clean. I strongly favor milking by machinery for several reasons. First, it is not always possible to obtain suitable persons for work in the dairy. The cost of employing labor is considerable. Often the hands employed become neglectful. Twelve cows are sufficient for one person to hand milk twice daily. If 36 cows were milked for nine months, the cost of milking would amount to £180. Two milking machines could be installed for about £100. These two machines would milk four cows at once, twice daily, for nine months, which would cost £14 16s. for fuel and oil. One man and a lad should be sufficient to attend the machines and also bail and strip the cows. These two could be employed at a total wage of £2 15s., including keep, which would make a total cost of £224; £44 16s. in excess of the cost of milking by hand. The full benefit would not be derived in the first year; but in the second there would be a balance in favor of the machines, taking into consideration the number of cows that could be milked compared with the expenses. The separator could also be driven by the engine. If the milk is not separated immediately, means should be provided to keep it warm and at the right temperature when put through the separator. Unless this is done you are not getting all the cream. Some people put hot water to the milk to warm it before separating. This is not a good plan. I prefer putting the milk through the separator as soon as possible after it is taken from the cow. In discussing the subject members advanced the view that, although it was always advisable to hold feed on hand, silos were too expensive for this purpose; it would be found better to make hay of the grass that could be cut. Mr. Hackett had worked out the relative costs of hand and machine milking of cows, and was of the opinion that the latter was preferable.

Port Elliot, April 20.

(Average annual rainfall, 20½ in.)

PRESENT.—Messrs. H. B. Welsh (chair), J. F. Vince, I. Brown, T. Chibnall, W. W. Hargreaves, and W. E. Hargreaves (Hon. Sec.).

TEN YEARS AS HON. SECRETARY.—Mr. W. E. Hargreaves, who was leaving the district, tendered his resignation as Hon. Secretary to the Branch, which position he had held for 10 years. Members referred to the untiring energy which had characterised his service during that period, and expressed regret at his departure.

Strathalbyn, April 27.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. J. W. C. Fisher, J.P. (chair), F. S. Traeger, J. C. Heinjus, W. J. Springbett, F. Collett, and J. R. Rankine (Hon. Sec.).

IMPORTED SUPERPHOSPHATES.—Considerable discussion took place concerning the proposal that an import duty should be imposed on superphosphates. A resolution was unanimously carried protesting that such an action would seriously damage the producing industries of the State,

PREPARATIONS FOR SEEDING.—Mr. J. C. Heinjus read a paper, in which he said the fallow should be cultivated and harrowed after rain in the summer, and just before drilling in the seed. After the seed had been drilled in it should be harrowed again. He preferred Marshall's No. 3 and White Tuscan wheats, and New Zealand Cape oats, and would sow not less than 1 bush. and 2 bush. to the acre respectively. He pickled the seed in a solution of 1 lb. of bluestone for every 9 bush. of seed. He was a strong advocate of rolling all the crop, as it was a great saving on machinery. In harvesting it made the draught of machines one horse lighter. A considerable discussion followed the reading of the paper.

Uraidla and Summertown, May 6.

(Average annual rainfall, 42½ in.)

PRESENT.—Messrs. E. Hart (chair), J. Rowe, E. Hawke, Kessell, H. F. Johnson, H. G. Dyer, Shueard, F. H. Collins, G. Prentice (Hon. Sec.).

WELL-SINKING FOR IRRIGATION PURPOSES.—Mr. H. G. Dyer read a paper in which he stated that where it was desired to irrigate with well water great care should be taken to select a site where a permanent supply of water might be obtained at as high an altitude as possible. Timber should be used, the measurements of which, he thought, should be about 5 ft. long by 2 ft. 6 in. (end pieces), and about 9 in. wide and 2 in. in thickness. He preferred seasoned wood to young timber, as the young timber contained too much sap. If sawn timber could be procured it should be used, as it was much easier to adjust. Having dug the shaft to a depth of 6 ft. or 7 ft., it was necessary to log it to a height of from 2 ft. to 3 ft. above the surface in order to make the dump. The windlass barrel should not be more than 7 in. or 8 in. in diameter, as it was much easier to raise the dirt when a small barrel was used. A ½ in. wire rope should be used for hauling; this was quite strong enough. Plumb lines could be hung on each corner of the hole in order to keep the shaft square. When timbering, battens should be nailed in each corner to prevent end pieces from moving. If it were necessary to use explosives, the holes should be bored on a slant, as the explosive gave vent in contraction. If water were obtained at a depth of not more than 32 ft., and provided there was plenty of fall, it could be syphoned out. He would recommend driving in the bottom of shafts, as in so doing the supply was often strengthened. In the discussion which followed Mr. Kessell said that 2 ft. 6 in. was not wide enough for a shaft. Mr. H. F. Johnson had met with poor success in syphoning water to any depth. Mr. Collins preferred a round well if the ground were suitable. Members were of the opinion that split timber was better and stronger than sawn timber. The question of the divining rod was discussed.

SOUTH-EAST DISTRICT.

Kalangadoo, April 13.

PRESENT.—Messrs. D. W. Tucker (chair), W. J. Hemmings, G. Bennett, W. Drewitt, M. Kennedy, D. McCorquindale, J. Boyce, E. Earle, A. Rake, J. Mitchell, and J. A. Sudholz (Hon. Sec.).

KINGSTON CONFERENCE.—Mr. D. W. Tucker gave a very interesting account of the proceedings of the Conference of South-East Branches and his trip to Kingston, which was much appreciated by the members.

EXHIBITS.—Mr. Earle tabled several varieties of apples, including some very fine Five Crowns, and also a magnificent bunch of Doradilla grapes. The Hon. Secretary also tabled some Dunn Seedling apples. Mr. J. Boyce drew attention to the spread of stinkwort in different parts of the district. Mr. Earle informed the members that he had noticed several patches of it in his stubble, but when sheep had the run of the paddock they ate it off completely. Mr. Sudholz stated that a few years ago it grew very thick and strong in his paddock, but to-day there was no sign of it. He believed it to be a good healthy food for sheep, as his flock looked splendid while the weed was there for them to eat.

Kalangadoo, May 11.

PRESENT.—Messrs. D. W. Tucker (chair), S. Tucker, A. Gibb, G. Bennett, J. J. Guerin, W. J. Hemmings, M. Kennedy, E. Earle, J. Boyce, J. McDonald, W. Drewitt, A. Haines, J. A. Sudholz (Hon. Sec.).

VALUE OF SHEEP ON THE FARM.—Mr. J. A. Sudholz read an interesting paper, in which he showed the method he had adopted in connection with 80 acres of land on which he made a profit of £80 from 80 sheep in eight months. The paper was as follows:—"It was my intention to crop these paddocks, and so I kept them bare of feed during the autumn and part of the winter, so bare, in fact, that I found it necessary to truck the sheep to Adelaide in June, 1911. Owing to lack of assistance at the early part of the seeding season I decided to give up the idea of cropping all the farm and try to what effect it could be used for grazing. The 80 acres had been kept free of stock from the middle of June until August, with the exception of about a dozen horses and a few cows. During August I noticed the feed in the old cultivation grounds making rapid growth, and decided to put some sheep on it. Going to the scrub run I mustered some lambing ewes and picked out about 82 culls. I put a fair valuation on them at the time, according to prices received previously for the same class of sheep. Some had lambs at foot, while others were near lambing. Being culls, they were a mixed lot—comeback ewes mated with Merino rams, and crossbred ewes mated with Lincoln rams. I put this flock into a 33-acre paddock, leaving them until the feed was very low; then shifted them into 17 acres of good grazing. From there I turned them in on 30 acres of rank feed, Schanck clover and other common herbage. They had not time to eat it bare as No. 1 paddock had good feed again, and into it they went; and as the spring weather came on the grass did likewise, and it took the ewes and lambs all their time to keep it in check. Two ewes died through some unknown cause, and when the lambs were marked there were two above the number of ewes. These sheep were shorn about the middle of December, and, being a mixed lot, it was necessary to work the wool in with the remainder of the clip from the scrub sheep. The ewes out an average of 7lbs. to 9lbs. of wool, which realised up to 10½d. per pound in Melbourne for the comeback and 9d. for the crossbred, making about 5s. 6d. clear of expenses. The lambs cut between 2lbs. and 3lbs. per head, which sold at 7½d. per pound, making a return of about 1s. 7d. per head. As harvest was coming on the sheep were somewhat neglected; but as soon as I had a stubble paddock empty I weaned the lambs, which were now well grown and able to look after themselves. The ewes still remained on the 80 acres, and, being free from the lambs, commenced to put on extra weight. When a lad, I was standing by when an Assyrian hawker was buying sheepskins from a farmer. There were two lots of skins, one of a reddish color and the other of a greyish color. The buyer offered 1d. more per pound for the red skins, and when asked why replied, pointing to the reds, 'Them color skins always sell best in Adelaide.' These sheep and lambs were a steel-grey color, and while walking around them one day in January I wondered if it were possible to improve their appearance in any way before Easter, when I wished to sell. I then remembered the remark passed by the Assyrian, and decided to try an experiment. At the beginning of February I hooked four horses on to the disc plough and ripped up about 10 or 12 acres of stiff red soil. Taking a few of the ewes apart, the rest of the flock were allowed to roam over the ploughed land. In a short time their jackets were dyed a deep, rusty red, giving them a solid and weighty appearance. The experiment had been a success. On April 2nd I drove all the sheep into Elder, Smith, & Co.'s yards and, after drafting the ewes from the lambs, informed the clerk that it was my intention to have them offered in that way. However, I was prevented from doing this by acting on the advice of Mr. A. Watson, who advised keeping the two lots of greys (ewes and lambs) from the two lots of reds (ewes and lambs), which I did. Mr. J. Livingston inspected the sheep before the sale commenced and, pointing to the reds, remarked, 'They are pretty sheep, really prime.' Yet the same remark by the same gentleman was not applied to the greyish colored lot, a fact which speaks for itself. They were all passed in at auction, but two days later a buyer from Elder Smith's came to the farm and bought all the lambs, with the exception of six, at 10s. 6d. per head on the place. As there were only six rejected, which I kept, I must consider them worth the money to me. Elder, Smith, & Co. also found a buyer for the ewes at a satisfactory price. The ewes, as fats, were worth a clear 5s. per head more to me than if I had sold them as culls. Now for figures—Wool from 80 sheep, £22; wool from 80 lambs, £6; increased value of 80 sheep as fats, £20; value of 80 lambs at 10s. clear, £40; total receipts, £88. This I consider a very satisfactory return from 80 sheep. I might remark that in slaughtering sheep for use on the farm my experience has been that while the stiff soil has the effect of toughening the skins the carcass remains tender. Any person skinning a sheep that has been running on light soil will find that the skin will tear easily, therefore I do not doubt the remark of the Assyrian, and believe the meaning to be correct." Replying to a question, Mr. Sudholz said the wool and lambs were the profit and returns from the 80 sheep on the 80 acres.

Keith, April 27.

PRESENT.—Messrs. Morcombe (chair), Hutchings, Makin, Torr, C. B. Godely, Whitbread, Fulwood, Dall, Williams, and Lock (Hon. Sec.).

QUESTION BOX.—The programme of the evening took the form of a question box, and the following subjects were dealt with:—

Bridles or Springs for Stump-Jump Implements.—The general opinion of members was that springs were preferable, provided they were sufficiently strong to meet the demand made on them.

Sowing Oats and Wheat.—It was thought advisable that oats should be sown forthwith, without waiting for the rain; but with wheat better results would follow if the seeding were held over until a fall was experienced.

Poultry.—Generally members agreed that the best results would be received from the practice of yarding hens in small flocks; but they were not prepared to say whether the increased returns would pay for the extra trouble.

Wheat-Growing in the District.—Mr. Makin, who had been in the district for over 30 years, said the rainfall was ample for wheat-growing. Generally there was a superabundance of rain during June and July.

Kingston, April 27.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. Jackson (chair), Wight, Goode, England, Evans, Flint, and Barnett (Hon. Sec.).

SCRUB AND STUBBLE BURNING.—It was the general opinion that March was too late for scrub-burning in this district. There was practically no stubble-burning done here. Mr. Goode thought that December was the best time for scrub-burning, but that something should be done to deal with people who lit fires in hot weather and neglected to take precautions to prevent them from spreading. The Chairman also thought some people were careless with fires. The meeting was in favor of the district councils having the power to fix the dates for burning scrub and stubble in their own districts.

Kingston, May 25.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. Jackson (chair), Wight, Flint, Evans, Goode, and Barnett (Hon. Sec.).

EXHIBITS.—Mr. Jackson tabled samples of potatoes and apples. The latter were considered by members to be of very good quality.

POTATOES.—Mr. Goode, who had been following the practice of putting in manure with his potato seed, expressed the opinion that the result of this was that the crop generally consisted more of tops than of tubers. It was his intention to in future drill in the manure prior to planting the seed.

MORTALITY AMONGST STOCK.—Mr. Wight related his experiences with a mare which had been turned out into a good grass paddock immediately after foaling. Despite attempts to strengthen her, it was necessary to destroy the animal eventually. A *post mortem* examination revealed the presence of a few bots in the stomach, but not enough in his opinion, to cause death. The animal was found to have only one kidney, which was of an abnormal size. Several small nodules were found in the stomach. Mr. Jackson had lost a cow, and on opening her after death had found a bone penetrating the stomach at the entrance of the bile, to which he attributed death.

Lucindale, May 18.

(Average annual rainfall, 22½in.)

PRESENT.—Messrs. Rayson (chair), Johnson, Carmichael, Beaton, Ferguson, Dew, Langberg, Nosworthy, W. M. Secker (Hon. Sec.).

FERTILISERS.—Mr. W. M. Secker read the following paper:—"The term manure is often incorrectly used in place of fertiliser, and it may here be an advantage to show the distinction between the two. Manure is a substance which, besides supplying one or more plant foods to the soil, also restores humus, whereas a fertiliser is a substance which supplies plant foods and no humus to the soil. Some of the plant foods are nitrogen, phosphoric acid, potash, lime, iron, magnesia, soda, sulphur, chlorine. Nitrogen, phosphoric acid, potash, and lime are removed from the soil by growing crops in a greater degree than any of the other plant foods, and to restore these to the soil again we have

to make use of the fertilisers according to the plant food, and the quantity we think advisable. The fertilisers which contain nitrogen in a greater or less degree are nitrate of soda and nitrate of potash, containing it in a nitrate form. Sulphate of ammonia contains it in an ammoniacal form. Dried blood, bonedust, bones, and digested refuse contain it in organic form. Nitrogen is not available to plants as a nitrate, and it if is contained in a fertiliser in an organic or ammoniacal form, it has to undergo a chemical change by means of the agencies of the soil before the plant can make use of it. In the use of nitrogenous fertilisers care must be taken not to give too heavy a dressing, as too much nitrogen forces the growth of the plant at the expense of the grain or fruit. Potash is contained in the following fertilisers:—Nitrate of potash, potash chloride, sulphate of potash, kainit, and wood ashes. The function of potash is to improve the quality of the yield, and its action is more marked when used in conjunction with another fertiliser. Magnesia and chlorine (or common salt) are both contained in kainit. Phosphoric acid is contained in fertilisers in three forms, namely, water soluble, citrate soluble, and insoluble. Phosphoric acid is contained in a water soluble condition in all superphosphates (both ordinary and concentrated superphosphate), and bonedust (mixed), and nitro superphosphates. That which contains citrate soluble phosphoric acid is Thomas phosphate; and those which contain phosphoric acid in an insoluble condition are tricalcic phosphate, calcium phosphate, guano, bonedust, bones, and digested refuse, and nitro guano. I may here state that Thomas phosphate also contains a very small amount of insoluble phosphoric acid. There are two points to consider in connection with the purchase of superphosphates. These are the percentage of water soluble phosphoric acid and its free running qualities, or, in other words, the amount of moisture contained in it. The greater the amount of moisture in a super., the more it will stick to the drill. This is a great annoyance, as by sticking it partly blocks the feeders; consequently there is not so much going on to the acre, and it necessitates the frequent cleaning of the feeders, thus causing a loss of time. The advantage of the water soluble phosphoric acid is that it can become quickly incorporated with the soil. It is hard to say how long phosphoric acid, supplied to the soil by a superphosphate, remains in a water soluble condition. Plants are not absolutely dependent for their food supplies on those ingredients which are water soluble, but are capable, by means of the slightly acid juices contained in their roots and root hairs, of making use of the less soluble forms. The super., having been put in the ground, becomes distributed, the phosphoric acid combines with the lime, iron, and alumina, or oxide of aluminium in the soil, and reverts into the citrate soluble form, and remains so until it is attacked by the acid secretions in the roots of growing plants. The greater the amount of lime in the soil, the quicker the water soluble would be converted into citrate soluble phosphoric acid. The following are a few hints on mixing fertilisers:—Nitrate of soda should not be sown at the same time as the seed, on account of its immediate solubility, and the fact that it is already in the form in which plants make use of it. The nitrogen is liable to quickly leach out of the ground or be removed in the drainage water; consequently it is used as a spring top-dressing, when the plants have plenty of root and are able to quickly make use of the nitrogen. Sulphate of ammonia should never be mixed with lime, Thomas phosphate, or any manure containing lime, as the lime drives off the ammonia, and the quality of the fertiliser is lowered. Superphosphates should never have lime in any form, nor Thomas phosphate, mixed with them. Bonedust and superphosphates may be mixed, and gypsum may be mixed with most fertilisers. Farmyard manure and guano must not have Thomas phosphate nor lime added to it. The following should only be mixed immediately before use:—Potash salts and lime, potash salts and Thomas phosphate, lime and kainit, kainit and Thomas phosphate. The following may be mixed at any time:—Sulphate of ammonia with superphosphate, or farmyard manure, or guano, or kainit, or nitrate of soda. Potash salts with superphosphate, or farmyard manure, or guano, or kainit, or nitrate of soda, or sulphate of ammonia. Nitrate of soda with lime, or superphosphate, or Thomas phosphate, or farmyard manure, or guano, or kainit. Kainit may be mixed with potash salts, or sulphate of ammonia, or superphosphate, or farmyard manure, or guano. The foregoing information in regard to the mixing of manure and fertilisers was prepared by Dr. Giekins, of Alzey, Germany." Mr. Langberg differed from the writer of the paper regarding the mixture of Thomas phosphate and superphosphate. One of the best crops he had ever grown had been dressed with this mixture. The reason he used it was that his super. was very sticky, and he mixed Thomas phosphate to make it run more freely. It would be found that as they were mixed they became very warm. The Secretary replied that in mixing these two together the lime in Thomas phosphate combined with and reverted the water soluble phosphoric acid in the superphosphates into citrate soluble phosphoric acid.

SHOT-HOLE FUNGUS.—Mr. Ferguson reported that his apricots had black spots on them, and the leaves were perforated with small holes. They had been so for three years, and he noticed that the disease was rather prevalent in this district. Mr. Langberg stated that it was due to small insects attacking the leaves and skin, and afterwards the fruit. The best remedy was to spray with Bordeaux mixture before the leaves formed, and again after.

DUTY ON IMPORTED SUPER.—Members agreed that the proposal to impose an import duty on superphosphate would result in a rise in the price of the manure at the expense of the producer, and were strongly opposed to the duty.

Mount Gambier, May 11.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Wedd (chair), Pick, Watson, Kilsby, Keegan, Buck, Engelbrecht, Ruwoldt, Sutton, Major, Botterill, Sassanowsky, Pritchard, Simes, F. Holloway, G. and D. Collins (Hon. Sec.)

THE FARM TOOLHOUSE.—The following paper was read by Mr. R. P. Pritchard:—“The toolhouse is a most useful addition to the equipment of a farm or station, and this usefulness increases in direct proportion to the distance one resides from the town. The valuable time that can be saved by having a few handy tools available at all times can scarcely be exaggerated. Perhaps a few S or G hooks are needed, a chain may require a link put in it, a drill pole or wagon shaft may need plating, or a horse may want a shoe removed. These, and a thousand and one other small repairs, come within the scope of the average farmer, who is, by reason of his occupation, a practical man. And how much more tidy it looks to see these repairs done in a workmanlike manner than to see wire or some other clumsy makeshift used for the purpose. With regard to the smithy first. The most important part of this is, of course, the forge. Of these there are two kinds, viz., those in which the blast is provided by means of bellows, and those which use a centrifugal blower. Both are suitable for the work, but for simplicity and reliability I favor the former. Next comes the anvil. This should weigh not less than 1cwt., and should be firmly fixed on a wooden block at a convenient height and not more than 8ft. from the forge. The vice next calls for attention. One of the long tail variety, firmly and rigidly fixed to a heavy bench or stout post not far from the forge will prove suitable. Vices are sold by weight, and I recommend one weighing about 75lbs. A swage block, weighing about 1cwt., should stand upon a wooden block or stump adjacent to the forge and anvil. This is a most useful addition to the smithy, for in its flat sides are holes of many shapes and sizes, while on its edges will be found a number of grooves of different section, which answer the purpose of bottom swages. In addition to the above I recommend the following accessories, and I have cut down the list as much as possible:—Farrier's rasp, farrier's pincers, farrier's buffer, farrier's hammer, hand hammer (2lb. weight), cross peen sledgehammer (10lb. weight), cold chisel, hot chisel, set hammer, flattener, one square and one round punch at 1s. 6d., hardie, three top swages at 1s. 6d., three pairs tongs at 2s. 6d., brass 2-ft. rule, 14-in. rough cut file, ½-in. round file, and ½-in. square file. These tools, including the forge, anvil, vice, and swage block, will cost about £11, which is a moderate figure when one considers the saving they will effect. To make the equipment of the smithy a little more complete, and widen its scope, I suggest the following additional articles:—Small drilling machine (to bolt on to a post), 12 twist drills for above at 1s. 3d., one top fuller and one bottom fuller at 2s. 6d., one set stock and dies from ½ in. to 1 in., one hack saw and 1 doz. spare blades. This extra list will bring the expenditure up to nearly £16. A few bars of iron of useful sizes should always be kept on hand, and all odds and ends of wrought iron, no matter how valueless they may appear, should be collected on a scrap heap, for very often one can find on this scrap heap just the piece of iron that is needed. Old and discarded implements, binders in particular, should not be parted with on any consideration. In fact, I go the length of saying that a binder is only entering a new sphere of usefulness when it can no longer be profitably worked in the field. Bolts and nuts, iron and steel of a variety of sizes, can be found in one of these implements, and the handy man will not be slow in turning them to useful account. To return to the forge. A supply of charcoal and coke will also be necessary. A tub or barrel full of water should stand close to the forge, and a box or shelf at the right hand side of the anvil, and almost the same height, is useful to place tools on temporarily. All tools not in actual use should be hung up where they can be plainly seen and easily reached, and should not be littered around the anvil or crowded on the above-mentioned shelf. The farm grindstone should be close to the tool-house, and, for the benefit of the plane irons and chisels, &c., in the wood-working part of the establishment.

It is advisable to make a practice of grinding rough tools near the edges of the stone, not in the middle. The middle of the grindstone's face will thus be always slightly round or convex, and better results will be obtainable. If, on the contrary, the face of the stone is hollow or concave it is impossible to grind a tool properly. To pass on to the carpenter's half of the shop. The first item here is the bench. It is advisable to have a good one right at the commencement, and such an one can be purchased for from £2 to £3. For the rest of the carpenter's outfit I cannot suggest anything better than to purchase a complete chest of tools. Doubtless some of our enterprising South Australian hardware firms put up complete chests of tools; if not, the sooner they do so the better. While on this subject I would also suggest to these enterprising firms that they should put up assorted parcels of bolts, nuts, and washers from $\frac{1}{4}$ in. to $\frac{3}{4}$ in., both square and round head, with extra nuts thrown in. Such a parcel, weighing, say, about 1 cwt., would prove invaluable to the man on the land, and would, I feel sure, command a ready sale. To return to the carpenter's shop. A variety of nails, screws, and tacks will be required, and for the convenient storage and classification of these and other articles that cannot be hung up on the walls or rafters, there is nothing to beat the kerosine or petrol case. If these cases, with their lids removed, of course, are stacked on their sides in rows against the wall and firmly fixed thereto, they provide excellent ready-made shelves and pigeon-holes. For nails, staples, &c., a good plan is to cut the sides out of kerosine tins. When so treated they make very serviceable drawers, which can be slid into the lower tiers of kerosine cases. The top ends of the tins should, of course, be outwards, so that their handles take the place of drawer knobs. In addition to a supply of hardwood for gates, swingletrees, &c., I suggest that a few lengths of red deal match lining boards, flooring, and shelving be kept on hand. A 14 ft. plank of 9 in. by 3 in. Oregon is also extremely useful. Such a plank is often needed for stacking grain, &c., and if a drill or binder pole happens to break a new one can be sawn out of this plank with a rip saw. These poles cost about £1 to buy as duplicates, and, even at that price, are not always obtainable. I have many times had to saw out a pole, and am never without an Oregon plank for the purpose. A book or slate should be kept in which to make a note of any article that is needed, and the earliest opportunity taken of supplying the want. If this practice is adhered to the annoyance of being short of anything when it is most needed will be avoided. Have abundance of light, keep the toolhouse tidy, have a place for everything, and everything in its right place: and above all, keep it strictly under lock and key." The Chairman said the advice Mr. Pritchard gave was very good, and the articles he mentioned, if they could get them, were all required. Mr. A. A. Sassanowsky stated that the tools enumerated by Mr. Pritchard seemed a good deal to have on the farm, but all were required. His advice to farmers was not to go into heavy work on their own account, as they might make a botch of it, but small things were often required which could be done by them. Any farmer 10 or 20 miles away from the town would find it necessary to have a real good tool shop, but he doubted if it would pay a farmer near the town to have such a shop. He had seen Mr. Pritchard's tool shop, and it was undoubtedly equal to that of any blacksmith in Mount Gambier. Mr. J. H. Buck thought that to any farmer who lived 10 or 12 miles from the town, or even six or seven miles, it was handy to have these tools. It was not the cost of purchasing a new article in the town that was the consideration, but the loss of time in going for it when, if the farmer himself had the appliances, he could make it himself. For £10 or £12 he thought a farmer could purchase all the tools that he really required. Mr. J. Keegan thought a farmer might not need all the tools mentioned at first, but as he gained knowledge he might require them. Mr. J. Botterill said want of system was a great fault on many stations and farms, and method was very essential on any property. On one occasion the chain of the Ferrier wool-press they used broke. They put several strands of wire together, tied them to a log at one end and at the other to the different spokes of a wagon, and thus made a wire rope.

Naracoorte, April 13.

(Average annual rainfall, 22 in.)

PRESENT.—Messrs. E. Coe (chair), C. Bray, A. Langelsdecke, jun., W. Loller, A. Caldwell, and S. H. Schinckel (Hon. Sec.).

CO-OPERATIVE MARKETING OF FARMERS' CLIPS.—Following out the report of Mr. Loller on the proceedings of the Conference of South-Eastern Branches held at Kingston, Mr. Bray stated that the co-operative wool marketing proposal advised by the Wool Instructor would not work. He knew some small farmers who had very good flocks and got up their clips with great care, with the result that their wool brought high prices;

and there were others who had mixed sheep, and they took very little trouble in classing their wool because it was mixed. The question arose whether the farmer who had the good sheep was prepared to sacrifice its value to co-operate with the farmer with the mixed sheep. If all the farmers with inferior woolled sheep clubbed together it would be all right. Mr. A. Caldwell said that the scheme looked all right in theory, but it would not work out in practice. Mr. Bray had struck the weak point in it. There were numerous farmers who grew as good wool as the large growers, and they got it up just as well for market as he did. It also brought as good a price in the market. Then there were a number of farmers who dealt largely in sheep, and their wool would be good or indifferent just according to the kind of sheep they had on hand at shearing time. He believed the wool-selling firms adopted some scheme for selling small farmers' clips together in lots, so as to obtain greater competition and better prices; but he supposed they grouped certain small clips together according to average quality, and they returned the average prices according to the amount of the respective qualities each clip contained. It was very difficult to work such co-operative schemes to pan out justly to all concerned. Mr. Loller said the Wool Instructor did not mean to put all wools in one pool, but to arrange them according to the respective qualities, and the man who had the largest quantity of good wool would get the best price. Mr. Bray thought that would leave a great deal to the discretion of the manager of the shed, and the woolgrower would never know if he were being dealt with fairly.

IMPROVING WHEAT BY SELECTION OF SEED.—With reference to his paper on this subject, read at the Kingston Conference, Mr. Schinckel said that he had advocated the culling of the inferior heads from the plot. Professor Perkins advised taking the best. There did not seem to be much difference. They put in a plot with a pound of seed; then, just as it was ripening, they pulled out what seemed inferior heads. They sowed that wheat again, and then they could cull out the best. He believed in starting with one good variety, and if they wanted a change they could put in another variety. He did not believe in picking out good heads at random.

Wirrega, April 27.

PRESENT.—Messrs. L. Y. Langdon, W. Fairweather, P. Prime, F. Meier, H. Exton, and L. J. Cook (Hon. Sec.).

NITROGENOUS MANURES.—The Hon. Secretary read the following paper:—"It is my opinion that the addition of nitrogen to our soils would greatly improve them, for, besides enriching the soil chemically, it would tend to hasten the sweetening. Our cereal crops turn very yellow and lose a lot of leaves at the end of winter. No doubt the frosts are responsible for a good part of this dying off, but I think it is the lack of available nitrates in the soil that is the greater cause. Nitrification is the natural process by which nitrogen is made into the available form of nitrate. The chief necessity to allow of the work of nitrification is a suitable temperature. We find that practically no nitrification can take place during winter or early spring, as nitrification ceases about freezing point, and is most active about 30° C. Then again the winter is often wet, and what little nitrate we have in the soil at the commencement is probably leached out by the end of winter, so that when our cereal plants commence their upward growth there is insufficient nitrate available. It should be worth our while to try the addition of artificial nitrates in early spring. Of these we have two in general use, viz., sodium nitrate and ammonium sulphate. Sodium nitrate is more popular, as it can be used with less danger to plants. Sodium nitrate should be applied as a top-dressing when the soil is well saturated with water, so that the nitrate will diffuse through the soil. It is useless to apply it to dry soils. Nitrates must be applied to the growing crop, so that the plants can use them at once, as the soil constituents are not able to hold them; but if the seeds come into contact with the nitrates, germination is hindered. The quantity to apply varies, but ½ cwt. per acre is the usual amount. This should be enough to revive a crop that is going yellow and keep it supplied until warm weather is experienced, and nitrifying bacteria are able to work actively again. The cost of sodium nitrate is high, viz., £14 per ton, which is equal to about 3s. 6d. per acre if applied at above-mentioned rate. Ammonium sulphate is also used as a top-dressing, but is far more dangerous, chiefly because of its caustic action on the green tissues of the plants. If, therefore, it lies on the surface, it may be too concentrated, and so blight the crop. If ammonium sulphate is used as a top-dressing it is necessary to incorporate it with the soil, and light harrow as soon after dressing as possible. Ammonium sulphate does not leach out very much, and so it is more frequently applied as a winter dressing."

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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Varieties of Maize for Forage.

The great need of a dairy district, particularly in a dry summer (states the *Journal of the British Board of Agriculture*) is an adequate supply of succulent fodder. As maize is eminently adapted to meet this requirement, it was decided to test the relative cropping powers of some of the best-known Canadian and English varieties. The English varieties tested were White Tooth, Early Prolific, and Red Cob, the Canadian being Selected Leamington, Wood's Northern Dent, Eureka, White Pearl, and Superior Fodder. Owing to the lumpy condition of the soil when the seed was sown the weights of forage obtained were comparatively small, the heaviest crop obtained being 13 tons 8cwts. per acre. Comparing the different varieties, White Tooth was superior to Red Cob, but the first three Canadian varieties, Selected Leamington, Wood's Northern Dent, and Eureka, were much superior to the English varieties. Not only was the weight per acre greater, but on their being chopped up they were found to be much more succulent. It is suggested that dairy farmers would be well advised to grow a certain acreage of maize every year as a safeguard against a dry season.

Women Win Success as Farmers.

One of the unique farmers' clubs was recently organised in Missouri. It is a woman farmers' club. In the past in different sections of America certain women under special conditions have engaged in farming, and some have developed their ventures into profitable successes. Wisconsin boasts that one of the best herds of Jersey cattle within its boundaries is owned and actively managed by a woman. Indiana numbers among its farmers a woman who has gained fame and profit as a feeder and breeder of Short-horn cattle. Texas is the home of several practical cattle queens who operate large ranches, while Oregon is proud of its women fruitgrowers, who have succeeded as apple farmers. These are isolated cases. It is quite different when 12 women, all of whom own and actively operate farms within a 150-mile radius of the State Agricultural College, are federated in one State. Missouri is the home of a large number of successful country-women. An interesting feature is that until they met at a farmers' institute at Columbia, where the agricultural college is located, they were not acquainted with one another.

Agriculture and Science.

Agriculture has just awakened to the fact that the scientifically-trained man can be of the greatest use. Until 20 years or so ago, the only science which had really established any definite claim to assist agriculture was chemistry. Even then every country, every colony, every agricultural society had its trained chemist. But in those days the chemist largely confined his attention to analysing manures, foods, and other agricultural commodities. All this is now changed. There are still analysts who perform the invaluable function of controlling the sale of fertilisers and feeding stuffs, but agriculture is nowadays employing scientific chemists to investigate such subjects as the problems of soil fertility and the growth of crops, and the laws of nutrition of animals.—*Journal of Royal Society of Arts.*

Horse-breeding in Austria.

Out of £2,560,110 voted for the Austrian agricultural budget for 1912, the sum of £303,600 is devoted to horse-breeding, £200,000 being allotted to veterinary service. The only larger item is the sum reserved for the State forests, which is double that given for the encouragement of horse-breeding. It will be understood that Hungary is not covered by the budget for Austria, the two great divisions of the Empire having sparate Departments of Agriculture.

Feeding the Soil Through Cattle.

Conservation of soils is a matter of necessity. Strong soils resist depletion, while nature flies the signal of impending danger where its productive capacity is weakest. Declining yields of grain and grass are coincident with abandonment of live stock husbandry. When the grain elevator supersedes the stockyards depletion of fertility follows. Recently (says the *Chicago Breeders' Gazette*) this journal has related a convincing story of the prompt manner in which the Waterman Hall farm in Illinois was rescued from threatened ruin by a sheep feeder, who in four years restored its original fertility. How Pike county came back by the manure route, from poverty to prosperity, has also been related. In that case the steer was the recuperating agent. Some years ago Southern Michigan averted serious conditions by feeding western sheep. In that section, even when the feeder gets only manure for his profit, he feels that he has the best of the bargain. Some years ago an extensive landowner in North-western Iowa, who made grain a speciality, asserted that he would never permit any live stock but work horses on his farms. Decreasing yields prompted him to change his policy, however, before his soil had deteriorated materially. He had sufficient foresight to

detect a danger signal. Each year some farmers begin to feed cattle, hogs, and sheep, owing to realisation that such a course is imperative if agriculture is to be profitably pursued. Even the casual observer has no difficulty in distinguishing the live stock-producing farm from that of the exclusive grain-grower. It is the stock-feeding county that boasts of material prosperity and the ability to maintain it.

Animal Losses in United States.

An official account of losses of animals in the United States by disease and exposure in the year ended on March 31st has been issued by the Department of Agriculture. The numbers per 1,000 for the country as a whole are as follows, compared with the averages for the preceding 10 years :—Horses, 22·9 from disease alone, against 18·8 ; cattle, 12·6 from disease and 21·5 from exposure, against 20·8 and 18·2 ; sheep, 26·6 from disease and 46·6 from exposure, against 25·3 and 34·1 ; lambs, 81 from disease and exposure together, no 10 years' average being given ; pigs, from disease alone, 89·2, against 51·2. The total losses for 1911-12 are put at 470,049 for horses, 2,497,581 for cattle, 3,834,702 for sheep, and 5,834,456 for pigs.

Vitality of Farm Seeds.

An extensive series of experiments was commenced (states the *Journal of the Royal Agricultural Society*, 1911) in 1896 with a view to testing—(1) how long under ordinary conditions of storage the vitality of certain seeds is maintained ; (2) to determine the annual loss of vitality ; (3) to ascertain the real value of seeds held over for one or two years ; and (4) to investigate the rapidity of germination of the seeds experimented with. Samples of 43 kinds of seed, including those of six cereals, 17 grasses, 12 clovers, six turnips and allied plants, carrot and yarrow, from the harvest of 1895 were obtained. The samples have been stored in paper bags in the close-fitting drawers of a cabinet, and have been regularly tested each year. Full details of the results are given. The following is a brief summary :—*Cereals*.—In the case of barley and wheat, the germination was but little affected during the first five years ; but thereafter a rapid loss of vitality occurred, and proceeded at an increasing rate till in the tenth year no live seeds remained. Oats were quite different. Not until the ninth year was there any serious loss of vitality ; but by the end of the fourteenth year no living seeds of white oats remained. Some of the black oats lived for two years longer. The greater vitality of oats as compared with wheat or barley is stated to be due

to the protection afforded to the embryo of the oat by the fact that in its case the glumes which, in wheat and barley, fall off as chaff, remain attached to the seed. *Grasses*.—The death of all these seeds occurred between the eighth and the thirteenth year; but there was a good deal of variation as to the manner in which the loss of vitality occurred. Some, such as timothy and tall oat grass, suffered little for the first four years, though after that the loss was rapid. In others, such as hard fescue and sheep's fescue, the loss was heavy and rapid until a germination of below 10 per cent. had been reached, but after that it remained stationary for a year or two. Still others, such as Italian rye grass and meadow fescue, showed a fairly steady decline from first to last. *Clovers*.—Of the three true clovers all the seeds of red were dead in 11 years; alsike and white showed a small percentage of germinating seeds in the eleventh test. Sainfoin was shorter lived, and lucerne survived two years longer. On the whole the clovers lose little during the first three or four years, then there is a rapid loss for another four years, and finally the last 10 per cent. of germinating power is only slowly lost during the space of another three or four years. *Turnips and Allied Plants*.—The special feature of this group was the remarkable drop in the germination during the tenth year. Practically all finally lost their vitality in the thirteenth year. *Rapidity of Germination*.—In these experiments records were also kept to ascertain the rapidity of germination, a character in which seeds differ greatly. In the first year 11 kinds of seeds completed their germination within a week, viz., barley, white oats, meadow fescue, timothy, white clover, sainfoin, swedes (2), turnips (2), and rape. On the whole, as the seeds became older the time for germination increased, though it was noticeable that in the case of the five seeds—smooth-stalked meadow grass, wood meadow grass, cocksfoot, sweet vernal, and sheep's fescue—which were specially slow in germinating, every one showed more rapid germination in the second year than in the first, and in three of them it was more rapid still in the third year.

Fertility of Land in India.

The *Agricultural Journal of India* contains an interesting article by Mr. Bernard Coventry (Officiating Inspector-General of Agriculture) on the question: "Has the Fertility of Land in India Decreased?" The writer, after referring to the results of cultivation in the several provinces, sums up his conclusions as follows:—"(1) There is no progressive decrease in the fertility of agricultural land in India once the period of virgin productivity is passed, but, on the contrary, the fertility of Indian soils has been more or less in a stationary condition, with a tendency to improve under better treatment. (2) The average of productivity may have become lower, owing to inferior lands having been taken into cultivation on account of the great

agricultural prosperity and expansion brought about by the peaceful influence of British rule, but this does not mean or imply that the objective fertility of the soil has become less. (3) India's rate of production is low compared with Western nations, mainly due to the amount of capital employed being small. If more capital is used, the rate of production will be greater."

An Early-Maturing Hickory King.

"For some years," writes Mr. Joseph Burt-Davy, F.L.S. (Government Agrostologist and Botanist), in the *Agricultural Journal of South Africa*, "I have been endeavoring to produce an early-maturing 8-row Hickory King maize to meet the persistent demand of high veld farmers. It is generally recognised that such a mealie would do much to increase the yield of maize on the high veld, because it would lengthen the planting season and reduce the losses from early frosts which at present seriously reduce the crop. Certain technical difficulties have been met with in this work which have delayed the realization of the results sought, but I am glad to be able to report that at last our efforts have been crowned with success. By selection of early maturing individuals, and by crossing, I have succeeded in producing a vigorous, pure white Hickory King (typical 8-row) which, planted in the middle of October, 1911, was dead-ripe and harvested on February 15th, 1912, and was safe from frost at least two weeks earlier. This was in no sense a weakling plant, ripening prematurely, but a tall, robust individual. There was only one plant of it, and this was self-fertilised, so that the task of 'fixing' the strain should not take long. The plant came from an ear of Hickory King x Black Mexican, of which most of the grains were black, though of the true Hickory shape; being white (*i.e.*, recessive) they have bred true to color. The ear carries only about 220 grains, being only about two-thirds covered, owing to lack of pollen to complete pollination. The butt is weak, the sulci are too wide, and the grain is a little on the small size even for the high veld, but these defects can be remedied. The great thing is to have secured the early-maturing character. The 220 grains are to be planted next season and the crop studied for possible variations. The progeny must then be planted in 1913, and it will probably be in that year that the tendency to split out into late and early maturing strains will be observed. If this tendency to vary is not too great it may be possible to issue a very limited supply of seed in 1914. But I wish to warn readers that another season may yet cause the new strain to take longer to mature. No breed of maize takes the same time to grow and ripen every year; early maturity is a relative character and very dependent on the season."

The 1912 Vintage.

The Government Statist having communicated with and received replies from all the wineries of the State, reports that 2,921,597galls. of wine were made during last vintage. This is a decrease of 16 per cent., or 548,461galls. on the previous vintage, though it is 90,460galls. more than the average of the last five seasons. Particulars of our vineyards and orchards for last season will be published in the next issue of the "Journal."

Imports and Exports of Plants.

During the month of May, 4,613bush. of fresh fruits, 1,296 bags of potatoes, 619 bags of onions, and 68pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 124bush. of bananas (chiefly overripe) were rejected. Under the Federal Commerce Act, 3,931 cases of fresh fruits, 77pkgs. of preserved fruit, and 515pkgs. of dried fruit, and 1pkg. of honey were exported to oversea markets during the same period. These were distributed as follows:—For New Zealand, 5pkgs. plants, 280pkgs. dried fruit, and 826 cases lemons; for India and East, 2,267 cases apples, 10pkgs. dried fruit, and 76pkgs. preserved fruit; for London, 20 cases apples, 40pkgs. dried fruit, 1pkg. preserved fruit, and 1pkg. honey; for South Africa, 818 cases apples and 185 packages dried fruit. Under the Federal Quarantine Act, 2,281pkgs. plants, seeds, &c., were admitted from oversea sources. During the month of June, 7,626bush. of fresh fruits, 2,522 bags of potatoes, 532 bags of onions, and 128pkgs. of plants were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 360bush. of bananas (chiefly overripe) were rejected. Under the Federal Commerce Act, 2,739 cases of fresh fruits, 62pkgs. preserved fruit, 701pkgs. dried fruit, and 64pkgs. of plants and seeds were exported to oversea markets during the same period. These were distributed as follows:—For London, 213pkgs. dried fruit, 61pkgs. seeds, and 1pkg. preserved fruit; for New Zealand, 307 cases lemons, 488pkgs. dried fruit, and 13pkgs. plants; for India and East, 2,422 cases apples, 10 cases oranges, 61pkgs. preserved fruit, and 3pkgs. trees. Under the Federal Quarantine Act, 1,076pkgs. plants, seeds, bulbs, etc., were introduced from oversea markets.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the enquirer must accompany each question. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

"H.A." asks whether there are any male birds with the hens in the Laying Competitions at Roseworthy and Kybybolite Poultry Stations.

Answer—No.

EFFECT OF EARLY PRUNING.

The Waikerie Branch of the Agricultural Bureau asks—"Whether the early pruning of either vines or trees causes them to come into activity and shoot any earlier."

Answer—Early pruning, *i.e.*, that performed as soon as the leaves fall, has a tendency to cause the topmost buds on the pruned shoots to start into growth earlier in spring than is the case with shoots pruned late in winter.

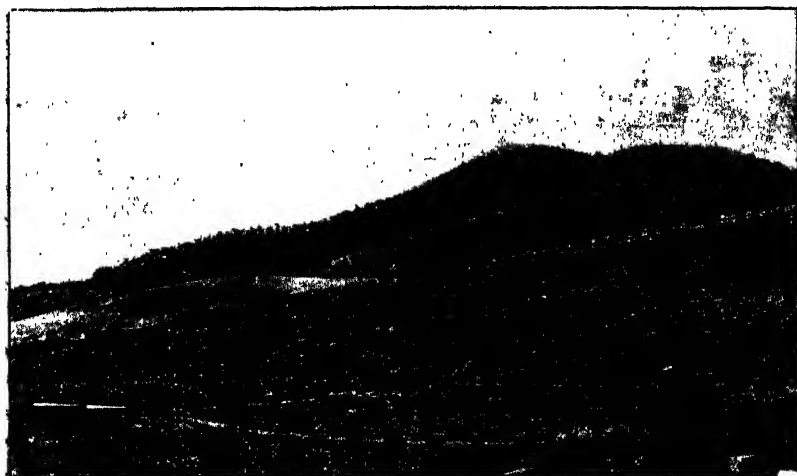
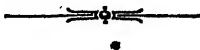
PRUNING ORANGE AND LEMON TREES.

"E. Y.," Forestville, asks—"When is the proper time to prune orange and lemon trees, and when should they be transplanted?"

Answer—The Government Horticulturist writes—"Pruning Orange and Lemon Trees.—The best season to prune these trees is in early spring, just as growth commences. Dead wood may be removed at any time, but as it is desirable that the growth of the tissues around wounds should begin without delay after the removal of limbs of greater diameter than, say, half an inch, it is well to restrict any winter work to the removal of small dead twigs by means of pruning shears. All wounds over half an inch in diameter should be smooth and have the sections covered over with paint to keep out wet and decay.

"Transplanting Citrus Trees.—This should be done when these trees are becoming active, and as here they make two growths—one in spring and another in autumn—the best time to transplant them are at these periods; and for large or old trees such as you refer to I prefer removing them about March or early in April, so that the roots may shoot again. If moved in spring and an early summer sets in, the heat may kill them. If, however,

you desire practically to shift these, cut them back severely early in August and lift them with as much earth ball enclosing the roots as possible. I would suggest the following procedure :—Having prepared the place for it, dig around the tree to be shifted, keeping 2ft. or 3ft. away from the stem at first ; after almost undermining this ball, work it away gradually until there is only as much soil as a couple of men can lift. Then carefully undermine the ball and gently drag a strong split sack beneath it. Two men then lift the tree, with perhaps a third supporting the top from swaying, to its allotted position, where it is set down ; and if much danger of breaking the ball is feared by removing the bagging, the sack may be left undisturbed and covered, and the soil trodden in. A shade made by suspending a piece of hessian on four stakes above the tree aids materially in assisting its early attempts to re-establish itself. At any rate this method should be adopted towards those trees from which the ball of earth breaks away from the roots. It should be mentioned that a day or two prior to removal the trees should be well supplied with water to consolidate the soil."



DISEASES OF FARM ANIMALS.

BY OFFICERS OF THE STOCK DEPARTMENT.

(Continued from page 1124.)

INFLUENZA IN HORSES.

The disease which is usually called influenza in horses is, unfortunately, common in South Australia. The name, like many others in common use on the farm, however, means little in itself, and generally covers several distinct forms of disease, such as catarrh or ordinary cold, strangles, with the form often spoken of as bastard strangles, purpura hæmorrhagica, for which there is no everyday name, and various affections of the lymphatic or waste-removing system, which often show themselves by soft swellings along the breast and belly or affecting one or other of the legs; especially in one form of influenza, pink eye, the swelling and reddening of the eyelids is very characteristic. Real influenza is a specific contagious fever caused by a very minute organism, or more probably by the joint action of two kinds or more of these microscopic germs, which are always present in the blood, but which only become able to work mischief when, owing to climatic or other causes, the animal's constitution is so altered that the germs are able to get the upper hand of the cells which act as the sanitary police corps of the body.

SYMPTOMS.

The appearances of the symptoms of influenza are so varied in character and manner in which they are shown that it is a matter of some difficulty to form a diagnosis at first glance; but in an ordinary type of case the symptoms occur in the following order:—The horse is dull at work and the coat stares; the appetite falls off, and there is a rise of temperature which may be verified by the use of the clinical thermometer; the lining membrane of the nostrils and eyelids becomes a bright red, and there is running from the nose and eyes, sometimes the tears are so freely shed that the hair of the face is scalded off by their flow; the pulse is at first over full and throbbing, but if the disease continues for some time it becomes weak and thready, though still fast; the breathing becomes difficult, hurried, and shallow; the flow of urine is generally lessened in quantity, and not infrequently it becomes high colored and oily or ropy in consistency; the bowels are affected in quite opposite ways, most often they are bound up, and the dung passed is small in quantity, the dung balls being coated with a slimy mucus and

very light or pasty in color; but if the disease attacks the liver then there is a foul-smelling diarrhoea, sometimes light in color, sometimes very dark. When the liver is involved the lining of the eyelids and nose takes on a yellowish dirty tinge. A very common symptom is a stiffness of the loins, or a rheumatic lameness affecting one or more legs and shifting from one to another. Frequently a horse which has not been noticed to be ailing when leaving work in the evening is found to be very stiff in the morning, and it is no uncommon thing to find several in a stable affected in this way. This is alarming, but when the cause is known there is no need for serious anxiety. If the horse is standing in a stall the lameness will be particularly marked when backing him out or turning him round. If the horses are in the paddock, probably the earliest symptom to be noticed will be the stiffness with swelling of the leg and the so-called milk veins under the belly, which are really lymphatics, also those running along the side of the chest. These swellings, in severe cases, will affect the neck and shoulder, and become very large around the hind limb, udder, and under the belly. However, the swellings affecting the head do not cause the same amount of glandular enlargement as in strangles, and the discharge from the nose is more glairy and watery than in that disease; while the very characteristic puffiness and reddening of the eyes in influenza is not noticed in strangles.

The loss of appetite which accompanies influenza is the cause of a large number of severe cases, as the animal's strength is rapidly undermined by the disease, and it soon becomes very weak from want of nourishment. Frequently complications affecting the digestive organs set in, and one finds a recurrent form of colic occurring. But from the nature of the disease, the breathing organs are those which generally become involved, inflammation of the throat, laringitis, with congestion and inflammation of the lungs being results which one most often finds occurring after the disease. Unfortunately a large proportion of such cases are due to faulty drenching, either through carelessness or ignorance, and it is most probable that a number of fatal cases of influenza would have a different end had the patients been drenched in a proper way—not through the nose, or with head triced up as high as it will go without dislocating the neck.

Usually the disease runs its course in 10 days or a fortnight; but when it occurs in the virulent form of pink eye it is not uncommon to find animals dying in a few days, and in some instances in a few hours.

TREATMENT.

Treatment may be very simple and yet effective; but, undoubtedly, it must take the form of good nursing, sanitary surroundings, and kitchen medicine in the form of tempting food. The bowels should be kept open by saline laxatives, which will also reduce the temperature. Epsom salts in small but frequently repeated doses, one or two ounces, may be given

three times a day in the drinking water or hot bran mash; or one or two drams of saltpetre may be similarly given. But in this disease hyposulphite of soda in half-ounce doses three or four times a day proves a valuable disinfectant for the system. Considerable advantage will be gained by giving an alcoholic stimulant, such as half a pint of gin or whisky, or a quart of beer, three times daily. When the lungs are involved, a solution of iodide of potassium should be administered, or one to two drams of it may be rubbed up with a little treacle and placed upon the tongue twice daily. When it is evident that the liver is affected, salammoniac or chloride of ammonia should be given, one-quarter to one-half an ounce ground up and mixed with treacle and placed on the back teeth. When there are colic pains, extract of belladonna may be substituted, mixed with treacle, and given in a similar manner. When recovery is setting in it will be hastened by giving a dram of dilute nitrohydrochloric acid in the drinking water once or twice a day, and following it up with vegetable tonics like gentian or calumba root, a dram of the latter and $\frac{1}{2}$ oz. of the former twice a day in the food.

The pain and stiffness caused by the swellings may be best relieved by fomenting with hot cloths with a few drops of turpentine on them, or if this cannot be conveniently carried out, a turpentine liniment, white oils, may be substituted. When there is difficulty in breathing relief will be obtained by steaming the head, a few drops of eucalyptus oil being added to the water. In those severe cases where the eyelids become glued together the use of vaseline or lanoline, after they have been cleaned with hot water, is recommended.

PREVENTION.

In no case is the old saying, that prevention is better than cure, truer than in this disease; and when there is an outbreak in the neighborhood every sanitary precaution should be taken. Stables, stalls, and feeding troughs should be rigidly cleaned and kept clean; extra care should be taken with the grooming and drying off of the team after work; and above all, horses should not be worked beyond their strength or so as to lower their condition. If one is noticed to be a bit out of sorts he should have a spell at once, and, where possible, should be isolated to prevent the spread of the disease; but when the disease breaks out among a number of horses at the same time the probability is that it is too late to isolate, and it will have to run through the stable. When the disease is about, public troughs, such as hotel troughs and those at public stables, will be best avoided. Nosebags, bits, and so forth used by an affected horse should be thoroughly cleaned in boiling water with a little washing soda in it before being used by another horse, and a fumigation of the stable with sulphur or the disinfection with formalin has often been found to be of value in checking the spread of the disease.

(To be continued.)

THE VALUE OF DIFFERENT CROPS AS GREEN MANURES.

By A. D. HALL, M.A., F.R.S., Director of the Rothamsted
Experimental Station.

Green manuring is a practice comparatively little followed in Great Britain because wherever fodder crops are at all generally grown the land is suitable for sheep, and the standard custom of the country has always been to feed off the green crop with sheep. Wherever one sees vetches or mustard or rape being turned in by the plough on these light soils, it is generally because the farmer has an excess of keep and fears he will not be able to feed off the fodder crop in time to get the land ready for the next stage in his rotation.

On heavy soils, however, where sheep cannot be folded, green manuring might well be more practised, especially as its value in improving the texture of the soil will be even more felt than upon the sands and chalk. Indeed, it is not unlikely that we shall see more green manuring in the future if corn prices continue to rise. Feeding stock is not always the most profitable operation upon the farm, so that many men would be glad to grow corn crops more frequently and reduce the acreage under roots, with their doubtful return for the very considerable expense involved, were it not that they feel they must make as much farmyard manure as possible in order to maintain the condition of the soil. It is in supplying the humus and in ameliorating the texture of the soil that farmyard manure becomes so indispensable, and though in this respect it cannot be replaced by artificial manures, yet a combination of artificial manures with the occasional ploughing in of a green crop will do everything that is necessary towards keeping the soil in the best possible condition.

It is not, however, the purpose of this communication to discuss either the value of green manuring or the difficulties encountered in practice, but only to set out certain experimental results which have been obtained at Rothamsted on the relative value of different crops used for that purpose. Whenever green manuring has been discussed or advocated, it has been assumed as a matter of course that leguminous crops are the best for the purpose, because of the nitrogen they gather from the atmosphere and add to the soil on being ploughed in. It is this atmospheric nitrogen that accounts for the benefits which a good clover crop confers on the succeeding crops in the rotation, even though the green manuring is only that due to the roots and stubble left behind after the clover has been cut; but the value of the clover is still more pronounced if the second growth is not cut or fed, but turned in so as to form a real green manuring, a practice which is not uncommon among the potato growers in the East of England. The classical

illustration of the value of green manuring with leguminous plants is found in the reclamation of the sandy heaths of East Prussia by Schultz, who grew successive crops of lupins by the aid of mineral manures alone, and then turned them in until the soil had been built up. Considering this accepted power of the leguminous crops to enrich the soil in atmospheric nitrogen, it was somewhat surprising to find in the experiments at the Royal Agricultural Society's Farm at Woburn that Dr. Voelcker always obtained better results with wheat grown after mustard than after vetches, both crops having been ploughed in. The experiments at Woburn (see *Journal of the Royal Agricultural Society*, 1906, Vol. 67, p. 300, and 1908, Vol. 69, p. 348) have been repeated until no possible doubt of their validity can be left. On the average the yield of grain after mustard has been 50 per cent. higher than after vetches. When the Woburn results were first manifest, similar plots were started at Rothamsted on the Little Hoos field, in order to see if the results obtained on the light dry land at Woburn would hold for the heavier and cooler soil that prevails at Rothamsted.

At the time the experiments were begun in 1904, this field was in a very poor condition, and more than usually short of organic matter, because it had been farmed for several years without any farmyard manure. No fertilisers were applied, but during 1904, 1905, and 1906, on the four plots rape, crimson clover, vetches, and mustard were sown, and turned in at the end of the summer. The treatment was repeated, because the land was in such poor condition that none of the crops were large, the vetches and mustard growing better than either the crimson clover or the rape. A crop of wheat was taken in 1907, after which, in 1908 and 1909, the green crops were repeated, a second crop of wheat being taken in 1910. The following table gives the results for the two crops of wheat:—

TABLE I.—*Yield of Wheat per acre after Green Manuring.
Little Hoos Field, Rothamsted.*

Previous Green Crop.	Dressed Grain. Bushels.	Dressed Grain. Lbs.	Offal Grain. Lbs.	Total Grain. Lbs.	Straw. Cwts.
1907. After mustard	29.9	1,923	96	2,019	22.5
1907. " rape	21.3	1,376	75	1,451	29.6
1907. " crimson clover	32.5	2,096	294	2,390	36.1
1907. " vetches	39.7	2,542	210	2,752	39.4
1910. After mustard	19.6	1,247	34	1,281	15.3
1910. " rape	20.8	1,327	37	1,364	16.3
1910. " crimson clover	30.8	1,926	85	2,011	27.0
1910. " vetches	34.4	2,144	127	2,271	34.7

From these figures it will be clear, as, indeed, it was to the eye, that the superiority of the wheat after the leguminous crops of crimson clover and particularly of vetches, is beyond any possible limit of experimental error. During the last year the value of the previous growth of vetches was particularly manifest, as the wheat on this plot possessed a fine color, very free from blight, and yielded more than any of the manured wheat plots on the experimental ground. A plot in the same field, where the wheat had been manured with cake-fed dung after the preceding crop of barley, only yielded 20-lbush.; indeed, all the manured plots in this field gave very poor results.

The following determinations of the percentages of nitrogen in the grain and straw would indicate that the superiority in the yield of the plots on which the vetches and crimson clover had been grown was due to the greater amount of nitrogen there available in the soil, but the general superiority of these plots over the wheat elsewhere must be set down to the better condition of the soil brought about by the accumulation of organic matter:—

TABLE II.—*Quality of Wheat Grown after Green Manuring.*

Previous Green Crop.		Weight per Bushel. Lbs.	Nitrogen in grain. Per cent.	Nitrogen in straw. Per cent.	Ratio of Grain to straw = 100.	Ratio of Offal to Dressed Grain = 100.
1907.	After mustard	64.3	2.065	0.276	59.9	5.0
1907.	“ rape	64.7	2.088	0.267	56.5	5.4
1907.	“ crimson clover	64.5	2.217	0.320	58.0	14.0
1907.	“ vetches	64.0	2.386	0.441	61.3	8.2
1910.	After mustard	63.5	1.849	0.3162	74.8	2.7
1910.	“ rape	63.8	1.852	0.3054	74.6	2.8
1910.	“ crimson clover	62.7	1.888	0.3756	66.4	4.4
1910.	“ vetches	62.4	1.953	0.3595	58.4	5.9

The grain and particularly the straw of the wheat grown after vetches and crimson clover are much richer in nitrogen than the corresponding grain and straw following the non-leguminous crops, pointing to a greater amount of nitrogen in the soil available for the former crops.

Speaking generally, the results are what might have been expected from the known power of the leguminous crops to gather nitrogen from the atmosphere; but until the experiments have been repeated for a somewhat longer period of time it will be impossible to determine with any accuracy whether there has been any accumulation of nitrogen in the soil of the plots growing mustard and rape, though these crops are themselves incapable of fixing

any nitrogen. One might expect that the soil bacteria, particularly the *Azotobacter*, would increase the nitrogen compounds of the soil when supplied with the carbonaceous matter which the green plant has drawn from the atmosphere. The *Azotobacter* organism, which is present in Rothamsted, as in most cultivated soils, is capable of effecting considerable fixation of nitrogen; but in order to do this it must be supplied with organic matter, by the oxidation of which it derives the energy necessary to bring the nitrogen into combination. Although it has been possible in the laboratory to raise the proportion of nitrogen in the soil by merely adding organic matter containing no nitrogen, and thus giving the *Azotobacter* material to work upon, the evidence that this process goes on in the field is still very scanty. Samples of soil, however, taken from this Rothamsted field at the beginning of the experiment, have been preserved, and further analyses after a few more green crops have been ploughed in may be expected to throw more light upon this question.

If the Rothamsted results, that vetches and crimson clover form good preparations for wheat because of the nitrogen they accumulate, are only in accord with what might have been expected, there still remains the entirely contradictory result at Woburn to explain. Dr. Voelcker has indicated that at Woburn the question is probably one of water supply; though the vetch crop does contain about twice as much nitrogen as the mustard which is turned in, it seems to leave the land in a drier and more open condition, and this on the light Woburn soil seems more to affect the crop than the extra nitrogen. It would, however, be unsafe to conclude that either the amount of nitrogen brought in by the two crops, or the effects upon the physical conditions of water supply of the soil are the only factors concerned. The processes of decay which the two materials have to go through before the nitrogen they contain can be available for the wheat crop are very complex, and are likely to be different in two such contrasting soils as the cool, close Rothamsted land and the drier and warmer Woburn soil, and one is quite ignorant of the possible influence of the intermediate products upon the growing plant. It should be remembered that the opinions of practical men as to whether vetches form a good preparation for wheat are absolutely contradictory in different parts of the country. Some men have found that vetches are always followed by a good crop of wheat, while others hold that the result is invariably poor. It is interesting to find that this divergence of opinion on the part of experienced men is illustrated so distinctly by the contradictory results at Rothamsted and Woburn; evidently here is material for a study of the causes in operation to bring about such different results both experimentally and in farm practice. From the practical point of view the Rothamsted results would seem to show that on strong land the farmer will do better to sow vetches or crimson clover for green manuring than one of the non-leguminous crops.—*Journal of English Board of Agriculture.*

GRAPE VINE PRUNING FOR AMATEURS AND BEGINNERS.

By GEO. QUINN, Horticultural Instructor.

(Continued from page 1110.)

FORMS OR SYSTEMS OF TRAINING.

Grape vines are naturally climbing plants, but under cultivation for economic reasons are trained either as low bushes or as climbers on trellises. The form given the bush vine is known as gooseberry bush or goblet; while the trellised vines are divided into (1) spaliers or espaliers, (2) cordons.

THE GOOSEBERRY BUSH OR GOBLET.

The model to be kept in mind when forming the gooseberry bush vine consists of a single stem or trunk, carrying two or three short main arms, each of which on strong specimens may be subdivided again into secondary arms, on which, in turn, the fruit-bearing wood is borne each year.

THE STEM.

The height found most suitable for the stem under Australian conditions varies from about 8in. to 18in. It is rarely in Australia the bush vine is grown in localities sufficiently frosty to necessitate the use of a higher stem to lift the foliage out of danger. With a stem about 9in. long the vine is able to resist all ordinary wind pressure in exposed positions; but unless care in framing the body is observed, the bunches of fruit may trail in the soil and become damaged. This point is of greater importance in respect to grapes when grown for table purposes than with those produced for wine-making or even drying. It is a generally accepted fact that the grapes ripened close to the warm soil are richer in sugar than those produced at an elevation of several feet above it, and in training their vines this knowledge is borne in mind by winemakers as well as by those who dry their grapes for raisins.

PRUNING THE YOUNG VINE.

The vines photographed on Fig. 6 represent the varying types of rooted vine-cuttings commonly dug from the nursery. It is true, seldom are these plants as strong as those shown in (b) and (c). Usually they are as weak as (a), and, in consequence, the first pruning must be of a drastic nature. This



FIG. 6.—One-year-old Vines before Pruning.

consists of reducing the plant to a single shoot and suppressing all but one or two buds upon that one. This leaves it projecting about 3in. or 4in. out of the soil only, and frequently at the next winter pruning the shoots arising from these buds are erroneously chosen for the main arms. This is an attempt to save time, which results in forming the vine too low—so much

so that in later years in roughly-tilled soil the plant appears to be stemless, and to raise the fruit out of the dirt the main arms must be permitted to become unduly exaggerated in length.

In Fig. 7, the first pruning of the three vines is depicted. It will be seen that of the three only (c) was deemed sufficiently strong to cut to the height desirable for the stem. The vines represented by (a) and (b) are required to make a shoot in the coming summer from which the stem may be formed. Therefore, wherever practicable, the strongest shoot or shoots arising from such vines should be secured to a stake to give them a vertical position. If great care be observed, under specially favorable conditions, only one



FIG. 7 - One-year-old Vines after Pruning.

shoot may be permitted to ascend ; but, generally speaking, for the purpose of strengthening the plant, all the shoots and foliage should be conserved during the first summer after transplanting takes place.

A strong young vine pruned as (c) in Fig. 7 should be fastened to a stake to establish it in an upright position, as has been done with (e) Fig. 9. When the second winter pruning season arrives (c) will present something of the problem indicated in (d) Fig. 8, the solution of which is seen in (d) Fig. 9, where three evenly-placed canes have been cut back to spurs which are eventually to be the main arms. It is not often three strong shoots are produced in this closely-spaced manner, and most frequently the pruner has to be content with two, as shown in Fig. 10.

The vine (e) in Fig. 8 represents the growth anticipated on grape plants after being pruned as (a) and (b) have been in Fig. 7, and the second winter pruning of such is instanced at (c) Fig. 9.

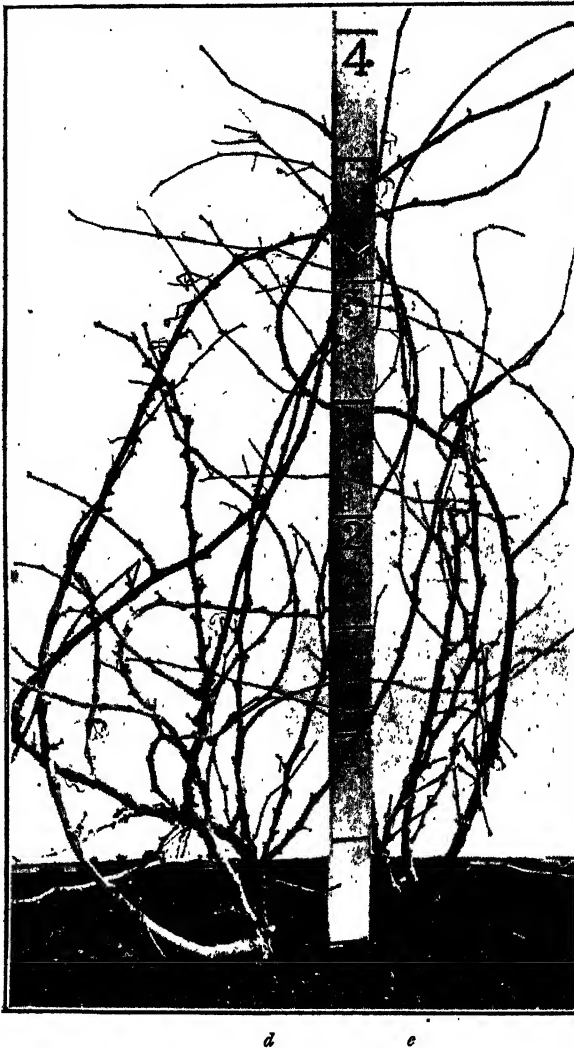


FIG. 8 — Two-year-old Vines before Pruning.

It may be remarked here that during the early stages, when tying to stakes is necessary to straighten the stem, the pruning sections should be made through the node above the highest bud intended for growth. This enables

the tying material to be tightly fixed around the stake and the terminal internode without restricting the sap in its course to the buds.

A well-grown type of vine, three years planted, and ready to receive its fourth pruning, is illustrated at Fig. 11. This is as (✓) Fig. 9 should be when a year older. It will be observed that several main arms are branched, but these were too closely set to permit of the branches being used as secondary arms; consequently a spur has been retained on each of four evenly-spaced arms. The growths which arise from the buds on these shall form the secondary arms, and as they are to complete the goblet-shaped framework

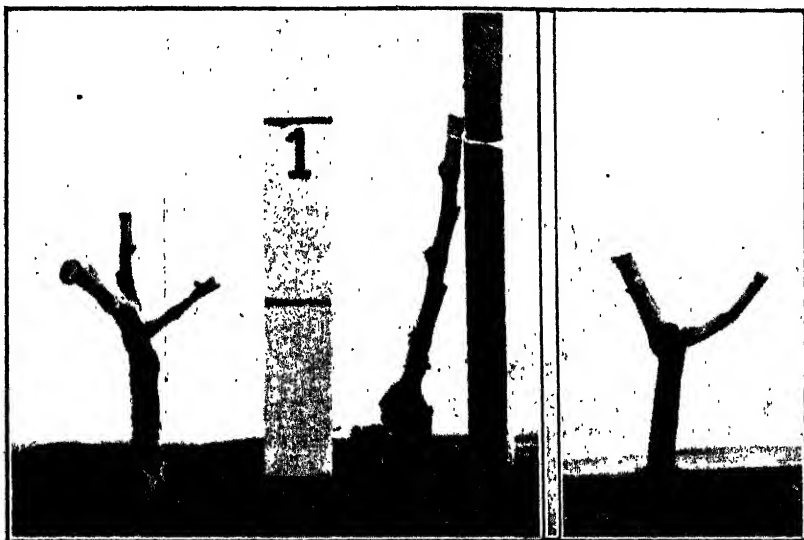


FIG. 9.—Strong Two-year-old Vines Pruned.

FIG. 10.—Two-year-old Vine Pruned.

the buds chosen are those projecting from the sides of the canes and not from either the top or under surfaces. It is desirable to follow this practice even if the spur retained is extended by an additional internode and bud.

Fig. 12 shows this vine pruned back to spurs, each carrying two or three buds.

The bush vine is now formed, and the annual treatment, if spur pruned, will consist of retaining a sufficient number of spurs on the plant to utilise its energies in the production of good crops of fruit, as well as the development of strong annual canes to maintain the same. A good type of a moderately vigorous mature vine grown as a gooseberry bush and spur pruned is given in Fig. 13. Some of the arms of this vine will soon need reducing in length as the accumulation of scars formed by the dead tissue which arises from

the wounds made at each winter's pruning will retard the flow of sap to the terminal spurs and the growth and crop will diminish. The pruner should, therefore, watch for the appearance of a water shoot low down on any extended branch and utilise it to replace the worn out member. If no such watershoot



FIG. 11.—Three Years Planted and before Fourth Pruning.

appears, a single spur only should be left at the end of the too extended arm, and it should be cut back to one bud only, as this restriction of the outlet for the sap at the top often results in forcing out a watershoot lower down upon the arm.

ROD PRUNING.

A four-year-old vine unpruned is photographed at Fig. 14, and at Fig. 15 the same plant rod pruned is depicted. This is called "Rod pruning," but in reality it is not strictly so, as a spur or more is retained with each



FIG. 12.—After Fourth Pruning.



FIG. 13.—Type of Mature Gooseberry Bush Vine when Pruned.

rod. The best results are obtained from certain varieties of grapes when rod pruned, and this is more particularly correct when they are grown to gooseberry bush shapes. In this case the rod is the fruit-bearing part, while from the buds on the spur arise the canes which shall form the rod and spur for the next season's operations, *as the old rod after fruiting*



FIG. 14.—Four-year-old Vine before Pruning
on Rod and Spur Method.

is completely suppressed at the next winter's pruning. In this form of pruning it is seen the spur is a greater factor in maintaining the shape and dimensions of the vine than the rod, and, consequently, the canes, which lend themselves to these objects are pruned as spurs, and those canes

of average strength which are farthest away from the permanent portions of the vine are selected to bear the fruit for the current season.

To increase their chances of setting the berries, the rods are often twisted, bent around, and tied to the ends of the spurs. In Fig. 15 this is displayed, but in practice the rods should be bent around the circumference of the framework of the vine rather than be arched over the top. This latter method tends to shade the centre of the vine too much, thereby affecting the ripening and color of the fruit as well as, in the case of vines growing in low lying or damp positions, encouraging the growth of parasitic fungi. The number of rods to leave upon a vine should be based upon its general vigor. A weak plant may have one or two only, and a strong plant three to five; but in

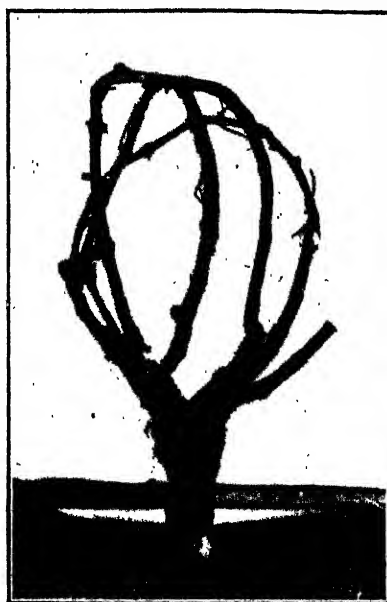


FIG. 15. - Four-year-old Vine, Rod and Spur Pruned.

any case more spurs should be made than rods, as an increase in vigor may demand the necessary canes for an increased number of rods at the following pruning.

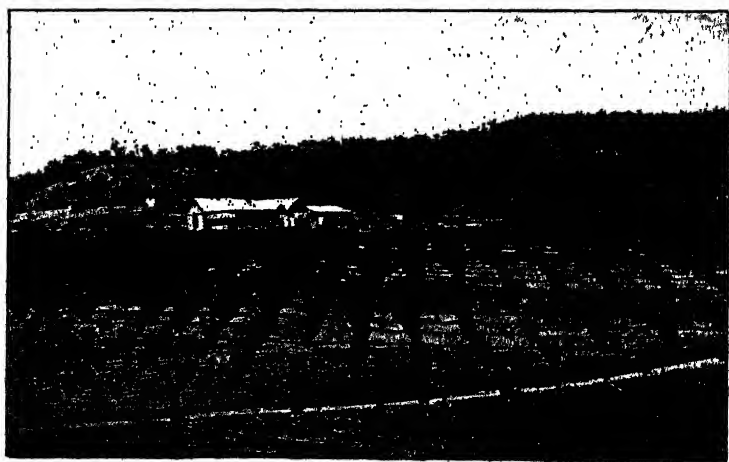
GENERAL CONSIDERATIONS.

In approaching a mature vine, whether spur or rod pruned, trained as a bush or trellised, the pruner must observe the vigor of the plant as illustrated in the growth of last season's canes. If they are numerous and very spindly and weak it will be desirable to prune back, allowing a lesser number of spurs or rods or both, as the case may be, than he observes were left at the previous winter; and just so far as the weakness of the plant indicates so these spurs

should be individually shorter. A very weak rod-pruned vine may need reducing to a few spurs only, as this practice usually results in a lessened number of shoots, which are individually stronger.

During all of these operations the pruner should have formed a firm conception of the shape to which it is desired the vine should be trained. On the other hand, he may find himself in the presence of vines displaying an exceptionally strong series of canes with possibly many watershoots. As previously remarked, these show a vigorous constitution in the plant, for which sufficient vent has not been allowed last season when pruning. The remedy is to leave a greater number of spurs and, if it be a variety needing rods, a greater number of rods, than there is evidence of having been left last winter. A pruner entering a strange plantation to prune may be confronted by unknown varieties. In such a case he should carefully scrutinise a number of the vines showing different degrees of vigor, and observe where the bunches of grapes have been carried and how many of them. If the shoots arising from the spurs left at the previous winter's pruning have borne fruit freely, then the variety needs spur pruning; but if there is little evidence of such a result, rods should be used wherever the condition of the vines permits.

(To be continued.)



ORCHARD AND HOMESTEAD.

LIVE STOCK. IN 1911.

GOVERNMENT STATIST'S REPORT.

The following particulars are taken from the return published by the Government Statist showing the live stock in the various counties and divisions of the State as on December 31st, 1911 :—

STRENGTH OF FLOCKS.

Cattle.—393,566 (384,862) ; increase, 8,704. Within the counties cattle decreased 2,770, but in the outside country the herds were increased to the extent of 11,474.

Horses.—259,719 (249,326) ; increase, 10,393. The number of horses in the northern country beyond counties has only been increased by 370, the balance of increase (10,023) being within the counties. The fact that 7,062 of these were draught horses denotes the continued expansion of the farming industry.

Sheep.—The lambing season within counties was far from favorable, and as a result the natural increase was not sufficient to provide for the heavy slaughterings (1,275,734) and losses by mortality without further reducing our flocks. In the outside northern areas the lambing was good, the flocks showing the substantial increase of 100,195, but within counties there was a decrease of 195,765. The total flocks number 6,171,907 (6,267,477), a decrease of 95,570. Of this number, 5,090,380 (5,286,145) were returned as within the counties, and 1,081,527 (981,332) as in the far northern and western areas outside of counties.

Pigs.—93,130 (96,386) ; decrease, 3,256. The decrease is insignificant when it is remembered that 88,170 pigs were slaughtered for consumption during the year, 46,248 of that number being used in producing 4,311,497lbs. of bacon and ham.

Goats.—13,728 (14,403) ; decrease, 675. Of this number, 3,218 were described by the owners as Angoras.

Other Stock.—6,617 (6,570) ; increase, 47. The following kinds are included under this heading :—Camels, 2,761 ; mules, 780 ; donkeys, 1,772 ; ostriches, 1,304.

DECENNIAL INCREASES.

During the last decade the following increases have taken place in the flocks :—

Cattle, 167,310, of which 45,808 were milch cows; *horses*, 94,416; *sheep*, 1,159,691; *pigs*, 4,244; and *goats*, 4,859.

SLAUGHTERINGS.

For home consumption and export :—

Sheep and Lambs, 1,275,734 (1,316,388); *cattle*, 87,293 (84,164); *pigs*, 88,170 (76,308).

STOCK PER SQUARE MILE IN EACH DIVISION, 1911.

Division of State.	Area in Square Miles.	Cattle per Square Mile.	Horses per Square Mile.	Sheep per Square Mile.	*All kinds in terms of Sheep per Square Mile.
Central	13,891	7.48	7.25	85.68	232.94
Lower North	12,401	3.66	4.65	92.96	176.05
Upper North	14,065	4.83	1.98	56.47	124.61
South-Eastern	15,585	3.50	2.10	88.39	144.44
Western	26,161	.53	.87	22.00	35.96
Outside Counties	297,967	.36	.06	3.63	7.86
Total South Aus- tralia { 1911 { 1910 }	380,070	{ 1.04 1.01	{ .68 .66	{ 16.24 16.49	{ 33.43 33.18

* For this purpose each horse or head of cattle equals 10 sheep.

MORTALITY.

Sheep.—The total losses reported as due to dogs and foxes were largely in excess of the previous year, the number being 93,148 against 83,574. The total loss of sheep from all causes being 238,838 (220,019), increase, 18,819.

Cattle.—Losses, 11,303 (7,714); increase, 3,589. Of this number 1,337 were attributed to dry bible, against 664 of the previous year.

Horses.—Losses, 6,893 (5,593); increase, 1,300.

DAIRYING.

Notwithstanding the exceptionally dry year the dairying industry was well maintained. The total number of cows (in milk and dry) being 121,803, an increase of 2,175, but the number actually in milk at the end of the year was less than the previous year by 1,865.

Butter.—9,694,666 (10,717,486) lbs. ; decrease, 1,022,820lbs.

Cheese.—1,517,561 (1,796,281) lbs. ; decrease, 278,720lbs.

Bacon and Ham.—4,311,497 (3,741,942) lbs. ; increase, 569,555lbs.

It may be mentioned that the previous year was a specially favorable one for the dairying industry, and the production of butter and cheese was a record. Thus, in view of the low rainfall of last year, the production may be regarded as most satisfactory.

Of the total quantity of butter made, 3,671,649lbs. were made on farms, and 6,023,017lbs. in factories.

Bacon and ham curing has made substantial progress during the last five years, the production being—1907, 2 311,004lbs. ; 1908, 3,392,162lbs. ; 1909, 3,348,050lbs. ; 1910, 3,741,942lbs. ; 1911, 4,311,497lbs.

Exports of Butter, 1911.—2,079,195lbs. of butter valued at £103,876 were exported to countries beyond the Commonwealth—2,041,115lbs. going to the United Kingdom, 33,600lbs. to South A.rican Union, and 4,480lbs. to Peru.

VALUE OF PASTORAL EXPORTS.

The value of the exports of our pastoral products—animals living, meat (frozen, &c.), skins and hides, tallow, wool, &c.—to countries beyond the Commonwealth States for the last five years is as follows :—

1907, £2,656,989 ; 1908, £1,973,977 ; 1909, £2,401,304 ; 1910, £2,720,783 ; and 1911, £2,571,660.

The decrease of £149,123 in 1911 in comparison with 1910 is attributable to the lower price of wool. 57,948,565lbs. of wool were exported over ea in 1911, against 53,654,831lbs. for 1910, or an increase of 4,293,734lbs., the values being 1911, £1,933,379 and 1910, £1,943,455.



POULTRY NOTES.

By D. F. LAURIE, Poultry Expert and Lecturer.

OPERATIONS FOR JULY.

POULTRY TICKS.

All poultry-keepers should carefully read the paper on "The Poultry Tick," which will appear in the current and following issues of the *Journal*. The life history of the tick is described with the aid of numerous photographs and micro-photographs. An extended series of experiments was undertaken to show the value of a number of insecticides, poisons, &c., in the destruction of the tick, and the best methods of coping with the pest are detailed.

PUBLIC SINGLE TESTING.

Numerous requests that a scheme of public single testing of laying pullets should be inaugurated at the Roseworthy Poultry Station have been considered. It has been decided, owing to the cost thereof, to defer consideration for the time.

LAYING COMPETITIONS FOR FARMERS' FOWLS.

Only one or two farmers have entered pens in the laying competition at Roseworthy. At Kybybolite, most of the competitors are farmers. Proposals have been received for the establishment of a separate section for farmers only in connection with the next year's Roseworthy tests. The proposal is one that I have often thought of forwarding, and now a farmer makes direct application. Such a test would mean only extra prize money, say, £10; the yard accommodation is already available.

Farmers should support the competition for the following reasons :—

1. The production of eggs and table poultry admits of unlimited expansion. There are good markets in Australia, and the oversea market is available when required. Prices are increasing, and there is no likelihood of a glut at any time. The agricultural departments and private enterprise in Europe and America are making strong efforts to encourage and foster poultry-breeding on modern commercial lines. The practical and wise men in those countries are alive to the importance of poultry as a source of wealth pro-

duction as well as of a national food supply. Are we in Australia so wise and so superior to the best science, thought, practical and commercial experience in the older countries that we can permit the uninformed and prejudiced to belittle one of the most promising interests the producers have?

2. While apparently a bountiful Providence has made our farmers wealthy as the result of wheat-growing, it should not be forgotten that other classes of the community may not be so fortunately placed. If a farmer in each country district would send a good representative pen of fowls to compete, not only for the prize-money, but also for the honor of the district, it would doubtless be the means of stimulating greater production and the adoption of more modern methods in each district.

3. Fowls on a homestead or in an orchard are of great value as insect destroyers. They also eat the seeds of many weeds. They gather up much grain that would otherwise be lost. They also fertilise the soil. These considerations are generally overlooked. The fox is killing off many of our most valuable native birds. Bird life, even poultry, is the most economical and satisfactory means of dealing with insect pests.

4. The laying competitions are doing a great work which is generally overlooked. They are bringing before the public the names of the breeders of reliable laying strains. True, these breeders may gain a little cheap advertisement, yet the fact that they are distributing among the primary producers of the State thousands of sittings of eggs and high-class breeding stock is sure proof that in so doing they must be greatly improving general production. We hear of many schemes for the production and distribution of improved wheats and other cereals. We hear of testing schemes for dairy cattle. Is not this public testing of the productiveness of fowls exactly on the same principle and equally valuable? Farmers and others have nowadays a choice of expert breeders to select from when buying eggs and stock. There is no country in the world where the scheme is so perfected. We are the envy of enlightened countries who have now turned their attention to poultry production. Still there are those who can see nothing in poultry.

POULTRY-BREEDING.

Recently quite a number of people have written to or interviewed me in reference to starting poultry-breeding on an extended scale. Unfortunately it rarely happens that the applicants have any experience. Poultry-breeding must be learned just as must other trades or professions. There is plenty of money to be made from poultry under proper conditions, but there are certain essentials. You must have sufficient capital to erect proper yards, houses, and other accommodation, and to purchase suitable stock. You must acquire the knowledge of feeding, breeding, and rearing your stock. You must not be afraid of a little honest work. Of course, if cricket and other sports must take precedence then you should give up all thoughts of

success in agricultural pursuits. You must do all things properly. You must have strong fox and thief proof yards and sanitary houses. Any old vermin-infested eyesore will not do for housing poultry. You must keep good poultry, whether for egg or table bird production, as the case may be. Do not be misled by those who say that any mongrel will do. I have yet to meet the man who is prepared to enter a pen of mongrels in one of the laying competitions—for good reasons. The man who breeds and distributes inferior mongrel stock is slovenly and unenlightened—not to say more. From a strict utility point, only the best is good enough. Why waste food, housing, and energy upon unproductive stock when with good utility stock the results would be so satisfactory?

POINTS TO REMEMBER.

Frequently inspect your poultry, the yards, and the houses. Cultivate the powers of observation. An energetic man who is observant will always succeed, if he also combines ordinary carefulness and thrift. If your poultry are not doing well, set about ascertaining the causes. If the hens are reasonably good and not too old, and if they are properly fed and housed and supplied with fresh drinking water, &c., they should give a good account of themselves. If you neglect your poultry you should admit the blame. Do not shift the blame and say that poultry will not pay.

Prevention is better than cure. The adoption of proper methods and strict attention to sanitation will result in freedom from disease. Diseases are not spontaneous—they are the result of faulty methods, want of precautions, &c.

Handle a bird if you wish to know its exact condition. So treat your poultry that they become tame. If you are rough and illtreat them they will distrust you and become wild, egg production is seriously affected, and you suffer other losses.

Provide an ample supply of green food. Plant rape, kail, lucerne, clovers, etc. The recent splendid rains have put the soil in good condition. Do not neglect the opportunity. If the yards are muddy, cart in some sand, and upon this spread dry grass, straw, &c. You must keep the poultry dry underfoot. Dirty yards are a menace to health.

- If you have not already done so you should now make full preparations for hatching a good supply of chickens, ducklings, &c. You have not much time left. Business will be brisk this year, and the consumption of table poultry will increase and you may expect good prices.

If you require information write for it, and do not be afraid to state your case clearly.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, June 12th, there being present Messrs. Chas. Willcox (chair), G. R. Laffer, C. J. Valentine, C. J. Tuckwell, Geo. Jeffrey, G. F. Cleland, T. H. Williams, J. Miller, Col. Rowell, C.B., Professors W. Lowrie and A. J. Perkins, and the Secretary (G. G. Nicholls).

LOCUST PARASITE.

A report was received from the Director of the Adelaide Museum to the effect that there were many locust-killing flies known in Australia, America, and elsewhere. Efforts had been made to introduce species from one part of the world to another, but without success.

THE RIDLEY MEMORIAL.

Some time ago an offer was received through Messrs. Fisher & Culross from a client desirous of donating £1,000 to provide scholarships at Roseworthy College as a memorial to the late John Ridley, the inventor of the stripper, on condition that the Government should subsidise the amount pound for pound. The Secretary mentioned that the anonymous gift was now available.

NOXIOUS WEEDS.

The sub-committee, comprising Professor Perkins, Messrs. Laffer and Miller, who had been appointed to inquire into the laws relating to the destruction of noxious weeds, and to suggest means to ensure the eradication of the pests, presented their report. It was pointed out that there was ample power in the original Act of 1862 to enable the noxious weeds problem to be effectively dealt with; at the same time it was recommended that certain clauses in the Municipal Corporations Amendment Act of 1903 and the District Councils Amendment Act of 1904 should be repealed to avoid conflict of authority and confusion. The Board decided to adopt the report and to forward it to the Minister of Agriculture. Professor Lowrie mentioned that there were fruit and stock inspectors, who, together with officers of the Agricultural Department, covered the country in the ordinary course of their work, and whose services could be utilised as inspectors of noxious weeds without additional expense to the State.

BUSH FIRES.

The Port Elliot Branch wrote, urging that special constables be appointed to detect offenders against the regulations of the Bush Fires Act, as the punishment of such persons would have a salutary effect, and would minimise

danger from widespread conflagrations during the summer. Mr. Laffer stated that in some places settlers formed vigilance committees or bush fire brigades and made self-protection the first essential. It was decided to suggest this course of action to the Port Elliot Branch.

PAYING FOR WILD DOG SCALPS.

A letter was received from the Port Germein Branch, asking "That the Government be requested to bring in a Bill compelling district councils to pay for scalps for wild dogs in their own districts, and that it be made a criminal action to bring in any scalps but those of wild dogs; also that the Government subsidise all payments for scalps made by the Vermin Boards; and, further, that the Government pay for all scalps of dogs taken from unleased Crown lands." The Secretary said that he had been advised that Mr. J. G. Moseley, M.P., had brought the matter of payment for scalps by district councils before Parliament last session, but without result. Up to 1906, district councils had power to pay, but in that year the clauses conferring it were repealed. Mr. Jeffrey admitted that the subject of payment for scalps was a contentious one among large landholders in the back country, and it was decided to advise the Branch that it was understood that Mr. Moseley intended again to bring the matter forward for the consideration of Parliament.

MATTERS FROM CONGRESS.

Three questions dealt with in Conference and referred back to the Branches were considered. The Secretary reported that the question of weighing wheat in bulk—as distinct from handling wheat in bulk—had elicited replies from 45 Branches out of a total of 130, 32 being in favor of the innovation and 13 against. The response from the farmers being so inconclusive, it was decided, on the motion of Mr. Tuckwell, seconded by Professor Lowrie, to leave the matter for the further consideration of the next Conference. Similar action was taken with regard to the question of selling cattle by live weight, as against the individual valuation of the buyer in the auction mart. Another matter submitted from Conference to the Branches for opinion was whether it was desirable that the Government should set aside blocks of land in new country for allotment to farm laborers. Thirty-four Branches replied in the affirmative and 23 were in opposition. Mr. Laffer thought it was the duty of farmers to provide cottages for their men, but if they did not do so the provision of blocks had much to commend it. Mr. Jeffrey thought farmers would be studying their own interests if they provided accommodation for their men on the farm. On the motion of Mr. Jeffrey it was decided that the Board send on a recommendation to the Minister of Agriculture asking for the recognition of the system,

PRODUCING ESSENTIAL OILS.

A letter was received from a firm of perfume manufacturers in London, through the Agent-General, relative to the demand for oil of geranium, oil of lavender, and oil of bergamot, and suggesting that the production of these might possibly be profitably undertaken in South Australia. Mr. Laffer mentioned that some years ago a Frenchman had manufactured perfume from the wattle blossom. It was decided to forward the letter to the Chamber of Manufactures. Professor Perkins promised, if possible, to bring forward some information regarding the cultivation of the plants required for the production of the oils and the matter of distillation.

LIFE MEMBERSHIP.

The privilege of life membership was conferred upon the following members of the Branches in recognition of services rendered to the Bureau and the agricultural interests of the State generally:—Gawler River—Messrs. T. P. Parker, R. Badcock, and H. Roediger; Whyte-Yarcowie—Hon. T. Pascoe, M.L.C., Mr. G. R. Mudge; Port Pirie—Messrs. E. J. Hector and Y. Johns; Mount Gambier—Messrs. T. Edwards and W. Mitchell; Cradock—Messrs. J. H. Lindo and P. Gillick; Mount Pleasant—Mr. J. F. Miller; Cherry Gardens—Messrs. T. Jacobs, C. Ricks, C. Lewis, and J. Lewis; Yongala Vale—A. Jamieson, sen.; Wirrabara—Mr. P. Lawson. It was decided that in future no person should be elected a life member, unless in recognition of special services, until he had been a member of the Bureau for 20 years.

LIME FOR SOILS.

The Director of Agriculture (Professor Lowrie) said that since his return to South Australia he had been living in the hills, and consequently the necessity for the application of lime to the cultivated soils there had been prominently brought under his notice. He had interviewed some limeburners, but found they could not supply quicklime to the farmers under 25s. per ton. That was a heavy charge when, as in the hills, the soil was literally crying out for applications of lime. Constant cropping, with heavy manuring, especially with sulphate of ammonia, had made an exhausting drain upon the lime in the soil, so that now much of the land was sour for the want of it. Consequently growers had not been able to get the same value from the application of bonedust and super, as farmers in the mallee districts, where the supplies of lime were almost inexhaustible. Ironstone country, without a shadow of doubt, required the addition of lime before anything could be made of it. Such, for example, was the stringybark range country at Mount Compass. Fortunately immense deposits of seashells, rich in carbonate of lime, existed on the spit near Kingscote. People there estimated the supplies in hundreds and thousands of tons. There were also places along the adjacent sea coast where deposits existed, although possibly not so perfect

as those at the Spit. Farmers had already begun to appreciate the value of sea shells as soil dressings, and one district council, convinced that "The sea hath its pearls," had sent them bills for a royalty of 5s. per load—a charge which he did not think could be sustained. He tabled specimens of fine sea shells from the Spit, and advised that hundreds of tons of similar material was awaiting bagging. It could be applied as it was, although if crushed still finer the application to the soil would be more readily effective. The cost of procuring supplies was comparatively low. Men on the spot would bag the material for 2s. per ton, and place on the ketch for 1s. extra. The freight per ketch to Port Adelaide was 5s. 3d. per ton, making 8s. 3d. in all. Allowing 1s. 6d. for wharfage rates and placing on trucks, the cost per ton was only 9s. 9d. The Railways Commissioner had agreed to carry the shells at the same rate as phosphates, a 20 per cent. reduction on miscellaneous classes when in truckloads, so that they could be carried 35 miles on the railway at 2s. 4d. per ton, or a total cost of 12s. 1d. per ton. He knew of no better source of lime supplies, considering cost and benefits. It was true that under some conditions the shells were not as valuable as quicklime. However, at the price, the shells were a valuable means of improving the fertility of the land, and he suggested that farmers and market gardeners would be well advised to co-operate and procure supplies. One might take 5 tons, another 20, and so on. They could send an oil engine and crushing plant to the spot and bag the stuff in its finest form. He had little doubt that the Government would allow it to be removed free of royalty, so that supplies could be got at the lowest possible rate. He had suggested to the Government that they should retain the lease of the Spit, and thus prevent any private individual from getting a monopoly. He did not want the Department of Agriculture to undertake the work of distribution, preferring that to be undertaken by the producers themselves. One ton to the acre was required as a dressing, but applications of from 1 ton to 2 tons were sometimes advisable. There was not sufficient salt in the shells to make its presence felt. Two samples analysed showed, one 94.25 per cent. carbonate of lime, and the other 94.7 per cent. carbonate of lime. Once in the soil it would take years thoroughly to "break down," so that the effects would become more apparent as the years passed by. While they could get lime in this form it was not necessary to go to the expense of purchasing quicklime.

NEW BRANCH AT BURRA.

The formation of a Branch of the Bureau at Burra was approved, with the undermentioned gentlemen as members—Messrs. J. H. Rogers, F. G. Scholtz, F. Carey, J. H. Winnall, S. W. Finch, W. H. Stevenson, H. Bagg, H. H. Thomas, W. H. Crowder, F. J. Kelly, G. R. Arnold, M. A. Radford, J. G. Oates, W. G. Heinrich, H. D. Edwards, P. Oates, F. Duldig, F. T. Marcus, C. Bartholomaeus.

NEW MEMBERS.

The following gentlemen were approved as members of the undermentioned Branches :—Colton—E. R. Dubois ; Uraidla and Summertown—W. Squires, S. Hawke, R. H. Sheuard ; Port Pirie—A. Bond, W. Kain, G. P. Goode, H. Brine ; Monteith—J. Ferries ; Narridy—E. E. Lang, J. E. Nicholls, T. R. Welbourne, G. Wells ; Utera Plains—G. Brinsby, F. H. Haywood, H. D. Rule ; Koppio—J. Newell ; Coomooroo—R. W. Robertson, J. A. R. Brice ; Longwood—J. H. Brown ; Artherton—A. Burns, R. Burns ; Redhill—W. Pengilley ; Penong—J. Stiggants, W. O. Harris ; Pinnaroo—S. Carter, L. M. Hannaford, F. Laycock, A. W. Burman, H. C. Hill, A. C. Schiller, F. G. Bonnin ; Forster—T. Searle, G. Searle, T. Retallack ; Mount Barker—G. R. Jones, H. Pope, H. Coppin, J. Gallasch, A. Liebing, J. G. Thomas ; Gladstone—A. R. Blesing, S. Gale, S. Masters, F. Humphris, O. P. Lines, J. Coe, J. E. Eley, J. Fisher, K. Wilcox, W. L. Evans, B. C. Love ; Lyndoch—J. E. Linke ; Bute—W. Gardiner, T. Kerin ; Mount Bryan East—L. W. Webber, B. C. Webber, G. Dare, F. G. Tralaggan, T. P. Griffen ; Whyte-Yarcowie—W. Mudge, J. R. Mudge ; Wirrabara—R. L. Watson, P. H. Hockridge ; Balaklava—W. J. Gleeson ; Hawker—B. Mansom, J. Schnell.



AGRICULTURAL BUREAU CONGRESS.

The following circular, relative to the Agricultural Bureau Congress to be held on September 9th, 10th, and 11th, has been forwarded by the Secretary of the Advisory Board (Mr. Geo. G. Nicholls) to the Hon. Secretaries of Branches of the Bureau :—

"FARES OF DELEGATES.

"The department will provide orders for free railway tickets for two delegates from each Branch, and will refund coach fares, where such are incurred, upon production of a receipt for the amount paid. In the event of water journeys, the steamer fare of *one* delegate will be refunded upon production of receipt. Hon. Secretaries are requested to advise me of full names of delegates as soon as they are appointed, and, if railway tickets are required, to state station at which train will be joined.

"In their own interests Branches will, of course, only appoint those who will be prepared to attend the several sessions of the Congress.

“PAPERS, ETC., FROM BRANCHES.

“Branches are invited to suggest subjects for consideration, and to send papers to be read, on the understanding that the Advisory Board will accept from those submitted the papers or subjects which are considered to be of most value to the Congress. Papers must reach the undersigned on or before August 12th.

“TOBACCO PLANT AND HOREHOUND.

“As the Government has been requested to declare the abovenamed plants to be noxious, delegates to Congress will be asked to vote as to whether, in their districts, such action would be regarded as expedient.

“DISPLAY OF PLANTS AND WEEDS.

“Members are invited to send to the Secretary Advisory Board, between September 2nd and 7th, or earlier, any plants or weeds which they would like to have identified by the Botanist. These should be in flower or in seed, and should be pressed between sheets of blotting or brown paper and placed between two pieces of cardboard. Juicy plants, which could not well be pressed, may be sent in a box. These plants will then be displayed at Congress, and Mr. J. M. Black, who is recognised as our chief authority on introduced plants, will give a chat about those sent in and answer any questions. It is believed that members will be glad to have many unknown plants identified in this way, and will readily assist in making up a good display of the same at Congress.

“BOUND VOLUMES OF ‘JOURNALS.’

“Some time ago I offered to set apart a copy of the *Journal* each month to be bound with the index upon the completion of the volume for those Branches that were prepared to pay for the binding. So far about 70 Branches have accepted the offer. I have received a quotation from an Adelaide firm for a first-class binding with cloth boards, leather back and corners, and lettered in gold, with Branch's name on back, for 5s. per volume. The binding can be put in hand upon the issue of the July number. If Branches will send in the 5s. straight away I will endeavor to have the bound volumes ready to hand to delegates at Congress. This matter should have early attention, as I must place the order in one line to get the price.

“Some of the 63 other Branches that have not yet ordered may do so now, sending cash with order; but as there are only about 30 more volumes put by, it will be a case of first come, first served.

“Your prompt attention to all these matters is earnestly requested.”

THE POULTRY TICK.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

[Paper read before the members of the Microscopical Society of South Australia, June 25th, 1912.]

In view of the great importance to this State of its poultry industry, a knowledge of the habits and best methods of exterminating this pest is most desirable. It is an astonishing fact that the majority of persons keeping poultry in infested localities are unaware that the ticks are present and that they are causing much financial loss. Many people who know of the presence of the ticks are content to let them remain. A few years ago (in 1907) the poultry tick was brought under the provisions of the Stock Diseases Act so that it could be under proper control. Experience shows that the majority of the cases of sickness among poultry in the late spring, summer, and autumn are due to the effects of the tick. In cases of disease it is always well to make diligent search for ticks, because if any are found the chances are that they have caused the trouble.

HISTORY OF THE TICK IN SOUTH AUSTRALIA.

There is no record of when this pest was first introduced into the State, and it is highly probable that it existed for some years before it was discovered as a cause of loss among poultry. It has been stated that the tick was first introduced from South Africa, and I offer no proof that such was not the case; but my opinion has always been that the tick came to Port Adelaide (where it was first discovered in this State) with importations of fowls from India. The ticks may have been introduced in old packing cases, bagging, &c., from India. About 30 years ago the poultry-breeders of Port Adelaide and districts complained of the losses among their poultry; later on the tick spread to different parts of the State. It is also found along the Murray, in the north of Victoria and other parts of that State, and in New South Wales, Queensland, and Western Australia. In the colder and wetter districts the tick does not thrive, as the surroundings are uncongenial. In the dry Far North they multiply rapidly and live in comparatively exposed (but dry) conditions. In this respect the habits of the tick in this State are similar to those of the tick in South Africa and elsewhere.

OBJECT IN VIEW.

My object in writing this paper is to distribute information among poultry-breeders which will render easier the task of exterminating this pest. I have made a close study of the tick during the last 20 years, and am confident that there is comparatively little difficulty to be encountered in eradicating it.

ACKNOWLEDGMENTS.

Although I have written and lectured on the life history and means of combating the tick during the last 18 years, I acknowledge the help I have received, as regards scientific descriptions, from the perusal of the works of Nuttall and Lounsbury. For the purpose of this paper I am deeply indebted to the splendid assistance rendered by Mr. Edgar J. Bradley, who prepared and mounted my specimens, and Mr. W. B. Poole, who undertook the micro-photographic work. With this kind and valuable help I am able to show the complete life cycle of the tick from the ovigerous female to the adult.

ITS PLACE IN NATURE.

The poultry tick belongs to the order *Acari*, and Nuttall places it as belonging to the super family *Ixodoidea* (Banks) family *Argasidae* (Canestri, 1890). *Genus argas* (Latreille, 1796). Nuttall and Lounsbury describe and figure two species, *Argas persicus* and *Argas reflexus*. Other authorities say they are one and the same. Nuttall says the following names have been suppressed:—"Americanus," "Chiché," "Mauritanus," "Miniatus," "Radiatus," "Sanchesii," "Columbæ," "Magnus," "Marginatus," all of which refer to one or the other as described by him. Further, he says, "In our opinion, 'Argas' comprises six well-established species." Amongst these he gives—(1) *A. persicus*, (2) *A. reflexus*, and under doubtful "brevipes" (Banks, 1908), which has legs shorter than *A. persicus* but which "may be but a variety." The weight of evidence is that our tick is *Argas persicus*.

GENUS ARGAS.

Nuttall gives the following general description—" *Argas persicus* (as type species). General characteristics—Body flattened, oval or rounded, with a distinct flattened margin differing in structure from the general integument. This margin gives the body a sharp edge which is not entirely obliterated even when the tick is fully fed. Capitulum (in adults and nymphs) entirely invisible dorsally, distant in adults by about its own length from the anterior border. On both dorsum and venter there are numerous symmetrically-arranged discs (scutellæ, foveolæ, patellæ—pits of various authors), generally round or oval, more or less disposed in radial lines. Elsewhere the integument is minutely wrinkled into irregular zigzag folds. Eyes absent. Pads (*pulvillus*) on feet, absent or rudimentary. The *argasidae*

are covered by leathery integument, they live several years and, as a rule, lay comparatively few eggs in small batches."

Argas Reflexus.—"Body narrower anteriorly; capitulum large and more anterior; margin irregular, wrinkled into radial striæ, forming a border 200 μ . (microns) wide = 1/125 of an inch, which is slightly turned up, especially in unfed specimens (hence "reflexus), and is stated to always remain yellow ("marginatus"); discs arranged much as in *Argas Persicus*, but the integument more finely wrinkled; ventral surface; anus nearly central with smooth anal ring; spiracles crescentric, elongated transversely, equal in length to the anal ring; genital opening as in *A. Persicus*. The male may attain the length of four millemetres by a breadth of three millemetres."

DESCRIPTION AND HABITS.

My experience (and that of the inspectors of the poultry section of the Department of Agriculture) is that even among experienced poultry-breeders there is a strange lack of knowledge of the habits of this pest, even if their yards and houses are infested. Many people do not even know the appearance of the tick. Despite the information published in articles and through lectures, there are many people who insist that in the larval form the tick is a distinct species from the adult, which they term a "poultry bug," from its similarity in appearance to a not unknown household pest. Many people do not visit their poultry houses at night; the tick is nocturnal, and although without apparent organs of vision, dislikes light, and promptly retreats when you enter a fowlhouse at night with a light. The adult tick is never found on poultry in the daytime. In the larval form the young tick is minute in size (.4 to .5 mm.), almost colorless, and has six long delicate legs. Such a small object is easily overlooked, or may be mistaken for one of the small fowl mites with which they congregate in cracks and crevices. These young larval ticks climb the perches and walls of the poultry houses and so join their host, the roosting fowls, on which they feed and remain firmly attached until gorged with blood. So closely do the larvæ cling to the fowl, not only by the beak or rostrum which is deeply inserted in the skin and tissues, but also by their six claw-furnished legs, that it is an article of belief among poultry-breeders that they are buried under the skin of the bird. Ticks of all ages secrete themselves during the daytime in cracks and crevices. In cold weather they are practically dormant and seldom come abroad. The practice of building poultry houses of old timber full of cracks is bad, as a ready harbor is offered them. A still more reprehensible practice is to build poultry-houses in contact with dwelling-houses or outside domestic offices. In my experience many houses and outhouses, other than poultry-houses, have proved to be badly infested. On many farms in the country the poultry roost in sheds where implements, vehicles, and machinery are kept, and where the horses are stabled and the cows milked. After dark

it is a risky proceeding to enter such structures, as in addition to ticks there are generally swarms of poultry lice which soon make their presence disagreeably prominent. Walls of masonry and brickwork contain many harbors in which the tick will take refuge, but their presence can always be detected by the dark marks round the entrance to the cracks and holes caused by their excreta.

Ticks may be conveyed from place to place by infested birds (ticks in larval stage), by feathers used by sparrows for nest-building (attached larvæ and eggs), by boxes (eggs, larvæ, nymphs, and other stages to adults). They may also be distributed through the medium of vehicles, &c. I have seen half a gallon of ticks shaken out of a stripping machine brought into a country town for repairs. Drays, carts, and buggies (even new, handsome vehicles) will, if housed in infested sheds and roosted upon by poultry, yield an abundant harvest. Such a condition of affairs, if unchecked, would lead to wholesale loss of poultry; those which do not die are generally anæmic and unproductive. Fortunately for the industry in this State, vigorous measures are being taken to combat the pest, and it is satisfactory to report that in many localities it has been exterminated.

LEGAL PROVISIONS.

As it is an offence against the law to allow ticks to infest any premises, or to offer for sale poultry infested, or from infested premises, the provisions of the Stock Diseases Act relating to the matter should be studied by all poultry-breeders.

TO ERADICATE THE POULTRY TICK.

To deal effectively with this scourge one must work on a sound system. All poultry-houses should be constructed with as little woodwork as possible. Galvanized iron makes the most suitable poultry house. The timber must be sawn and free from cracks, or angle-iron and tee-iron may be used in its place. In an infested yard the material of the old poultry-house should be burnt. The ground on which the old structure stood should be saturated with kerosine. This must be thoroughly attended to, as cases have occurred where the ticks have taken refuge in the soil (when dry). All old boxes should also be burned. The new houses should be erected on new ground if possible. I regard tick-proof perches and such devices as only temporary expedients and of no permanent service. You must eradicate the tick itself, and then an ordinary perch will serve. All perches should be easy to dismantle, so that tick may not lodge where two perches adjoin. Various insect destroyers have been suggested. Boiling water is a favorite with many; but how hot is the water after it is dipped out of the boiler and carried to the poultry-houses and after it has penetrated the cracks? For years I have recommended the free application of kerosine and oil as the most effective agent of tick destruction. It is certain in its effect if used alone (crude petroleum is

better), but it may also be used as follows:—Kerosine, one part; boiling soapsuds, nine parts; apply as hot as possible to the cracks and crevices and woodwork generally. The addition of oil to the above, if well emulsified by agitation, is to be recommended. Oil is deadly to ticks, as it, with the addition of dust, clogs their breathing spiracles. The galvanized iron "apex" poultry-house recommended by me in my "Poultry Manual" (first edition, 1895), was made without woodwork, and in case of infection could be cleaned by placing inside the house an armful of straw and applying a match, with the result that the house would become red hot in a few minutes. As many other insecticides have been recommended for the destruction of the poultry tick, I arranged a series of experiments which were made by Mr. Wm. Kühne, Poultry Inspector, under my supervision. As will be seen on reference to the tabulated results, many agents, other than those practically and commercially suitable, were experimented with to show the resistance offered by the tick. It will be noticed from the tables below that kerosine, used either as a 5 per cent. or 10 per cent. emulsion, stands out as the most effective and cheapest to use.

TABLE 1.—*Showing Experiments with Certain Preparations and their Efficacy for Destroying Poultry Ticks.*

Six ticks used in each test. Procedure—Total immersion.

Name of Preparation.	Strength.	Duration of Test.		Alive or Dead.	General Remarks.
	Per cent.	Hrs.	Min.		
Izal	2	1	23	Alive	
"	5	2	40	"	
"	10	3	35	"	
Carbolic acid	2	1	23	"	
"	5	2	40	"	
"	10	0	25	Dead	
Cyllin	2	1	35	Alive	
"	5	2	40	"	
"	10	1	0	"	
Phenyltas	2	1	25	"	
"	5	2	40	"	
"	10	4	5	Dead	
Cresol soap	2	1	35	Alive	} (Cresolis saponatus)
"	5	2	40	"	
"	10	0	25	"	
Jeye's fluid	2	1	20	"	
"	5	2	0	Dead	
"	10	2	0	Dead	
Lysol	2	1	35	Alive	
"	5	2	0	"	
"	10	2	35	Dead	
Kerosine in soap suds ...	2	0	25	Alive	
"	5	4	5	Dead	
"	10	4	0	"	
"	Pure	1	0	"	
Formalin ..	10	1	45	Alive	} Commercial 40 per cent. solution
"	Pure	0	50	"	
Caustic potash	2½	4	0	Dead	
"	5	3	7	"	Integument partly disintegrated

TABLE 1.—*continued.*

Six ticks used in each test. Procedure—Total immersion.

Name of Preparation.	Strength.	Duration of Test		Alive or Dead.	General Remarks.
		Hrs.	Min.		
Caustic potash	Per cent. 10	0	14	Dead	
Caustic soda	2½	4	0	Alive	
"	5	3	0	Dead	
"	10	1	0	"	
Hydrarg perchlor.	1 in 5,000	49	0	Alive *	
"	1 in 2,500	49	0	" *	
"	1 in 1,250	49	0	" *	
"	1 in 625	49	0	" *	
"	1 in 312	49	0	"	
Killeem Quick	2½	45	0	"	} Tobacco compound
"	5	45	0	"	
"	10	45	0	"	
"	Pure	3	0	Dead	
Tobacco wash	2½	24	0	Alive *	
"	5	24	0	" *	
"	10	24	0	" *	
Petrol	Pure	1	0	Dead	Evaporation too rapid
Pernanganate of potash ..	¼	29	0	Alive	
"	1	29	0	"	
"	2½	23	0	"	
"	5	23	0	"	
"	10	23	0	"	
Methyl alcohol	Pure	1	30	"	} Evaporation too rapid
Absolute "	"	1	30	"	
Formalin and methyl alcohol	5	24	0	" *	} Equal parts
"	10	24	0	" *	
"	Pure	1	30	Dead	
Iodine tinct.	2½	6	0	Alive	
"	5	6	0	"	
"	10	6	0	"	
"	Pure	6	0	"	
Xylol (<i>Xylene</i>)	"	0	1	Dead	(Di-methyl benzene)

* These solutions did not inhibit the activity of the ticks. All other ticks had to be slightly warmed before life could be detected.

In those instances where death occurred the test was concluded immediately on the death of the tick.

In many of the coal tar and similar series of germicides the weaker and practically only economical strengths of solution gave unsatisfactory results. In those cases where solutions of greater strength were effective, the experiment was made for scientific purposes, as practically the expense would be prohibitive. In many of the tests of this series we got the curious result that the tick is difficult to drown, even in comparatively strong insecticides. Ordinary watchglasses were used, all solutions were measured with extreme accuracy, and all records of time were exact.

It is evident that many agents are not effective in this form. It is interesting to record in this connection that I have dipped branches of a peach tree badly infested with black aphid into a strong solution of a tobacco compound and with practically negative results. Later I applied an even weaker

solution in the form of a very fine spray, vigorously directed, and the result was total destruction of the aphides.

To further test the same series of insecticides, and under conditions similar to those obtaining when a poultry-house is treated, a further set of experiments was conducted. Carefully prepared solutions of the strengths given in the table were used. The live tick (good, healthy, lively adult specimens, six in each test, were used in every instance); and two small pieces of deal were immersed in the fluid for one minute exactly and then transferred to a small glass tube and examined later with the results given.

TABLE 2.—*Showing Experiments with Certain Preparations and their Efficacy for Destroying Poultry Tick.*

Six ticks used in each test. The object of this series of tests was to submit the ticks to similar conditions to those experienced when a tick-infested poultry house is sprayed. Method of procedure—Tick-infested wood immersed in the solution for one minute, and placed in a test tube to drain. Duration of test—Three and a half days.

Name of Preparation.	Strength.	Alive or Dead.	General Remarks.
	Per cent.		
Izal	2½	Alive	} Very active.
"	5	"	
"	10	"	
Carbolic acid	5	Dead	}
"	10	"	
Cyllin	5	"	
"	10	"	}
Phenytas	5	"	
"	10	"	
Cresol soap	5	"	}
Jeye's fluid	10	"	
Lysol	10	"	
Kerosine in soap suds	10	"	}
Formalin	2½	"	
"	5	"	
"	10	"	} Commercial 40 per cent. solution.
Caustic potash	2½	Alive	
"	5	"	
"	10	Dead	} Completely dried up.
Caustic soda	2½	Alive	
"	5	"	
"	10	Dead	} Completely dried up.
Hydrarg perchlor	1 in 5,000	Alive	
"	1 in 2,500	"	
"	1 in 1,250	"	} Very active.
"	1 in 625	"	
"	1 in 312	Dead	
Killeem Quick	2½	Alive	} A tobacco compound. Tick apparently not affected by treatment.
"	5	"	
"	10	"	
"	Pure	"	} Tick apparently not affected by treatment.
Tobacco wash	2½	"	
"	5	"	
"	10	"	

TABLE 2.—*continued.*

Name of Preparation.	Strength.	Alive or Dead.	General Remarks.
	Per cent.		
Permanganate of potash	$\frac{1}{4}$	Alive	} Very active.
“ “	1	“	
“ “	$2\frac{1}{2}$	“	
“ “	5	“	
“ “	10	“	} Very reddish in appearance.
Methyl alcohol	Pure	Dead	
Absolute “	“	“	
Formalin and methyl alcohol ..	5	Alive	
“ “ “ ..	10	“	} Equal parts.
“ “ “ ..	Pure	Dead	
Iodine tinct.	$2\frac{1}{2}$	Alive	
“ “	5	“	
“ “	10	“	
“ “	Pure	“	

The results here are more encouraging, as the use of many agents, even in the weaker solutions, caused death. Particular attention is called to the failure of perchloride of mercury—this is the most powerful antiseptic known, and is a deadly poison. In the immersion tests this powerful poison had no ill effects; but in the second test a very strong solution, too costly and too dangerous to use, caused death.

(To be continued.)



Apiary of Mr. R. McDonald, Eyre's Peninsula.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started April 1st, 1912, and to terminate March 31st, 1913.]

Competitor.	Eggs Laid for Month ended June 30th.	Total Eggs Laid from April 1st, 1912, to June 30th.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS.

Cowan Bros., Burwood, N.S.W.	121	289
Tabuteau, J. O., Black Rock, Melbourne	80	212
Hodges, H., Pyalong, Victoria	86	164
The Range Poultry Farm, Toowoomba, Queensland	83	202
Brundett, S., Moonee Ponds, Victoria	86	211
Jessup, W. O., Caulfield, Victoria	94	229
Dawes, J. H., Granville, Sydney	117	292
Beadnall Bros., Gawler	109	299
Redfern Poultry Farm, Caulfield, Victoria	71	108
Kerr, R., Longwood, S.A.	74	250
Eckermann, W. P., Eudunda	74	199
McNab, J. A., Sandringham, Victoria	54	199
Mazey, P., Alberton	76	129
Broderick, P. J., Gawler	87	143
Redfern Poultry Farm, Caulfield, Victoria	59	187
Braund, J. E. and H. J., Islington	50	120
Dunn, L. F., Keswick	87	211
Hocking, E. D., Kadina	64	193
Groom, E., Peterhead	59	201
Pope, R. W., Heidelberg, Victoria	92	283
Haines, T. E., Fullarton Estate	77	148
Provis, W., Eudunda	72	179
Burton, W. S., Moonta Mines	68	188
Broster, G., Mallala	83	160
Brain, J. H., South Yan Yean, Victoria	67	241
Sargenfri Poultry Yards, East Payneham	83	285
McKenzie, H., Northcote, Victoria	73	212
McDonnell, J., Greytown, Rosewater	75	251
Browne, A. R., Hawke's Bay, N.Z.	97	244
Brain, J. H., South Yan Yean, Victoria	86	118
Marsson, C., Welland	53	94
Hutton, C., Parkside	81	171
Miels, G. & H., Littlehampton	68	117
Moritz Bros., Kalangadoo	68	238
Codling H., Mitcham Park	52	141
Troughbridge Poultry Yards, Edithburg, Y.P.	97	151
Irvine, A. W., Epsom, Auckland, N.Z.	78	195
Walker, P., Hicksborough, Victoria	72	197
Lampe, B., Kadina	18	53
Waite, F. J. O., Nailsworth	106	256

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended June 30th.	Total Eggs Laid from April 1st, 1912, to June 30th.
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SECTION I.—LIGHT BREEDS—Continued.

WHITE LEGHORNS.

Badeock, G., Mile End	55	121
McClelland, A., Mordialloc, Victoria	59	120
Tomlinson, W., Clarence Park	72	160
Roberts, L. L., Kadina	53	171
"Strathcona," Long Plain	71	162
Whitegate Poultry Farm, Deepdene, Victoria	87	195
Purvis, Miss Gracie, Glanville	66	221
Padman, A. H., Hyde Park	75	256
Sickert, P., Clarence Park	66	198
Purvis, W., Glanville	80	192
Rice, J. E., Cottonville	84	253
Hamill, H., Kogarah Bay, Sydney	50	125
Gurr, W. E., Kapunda	90	169
McLeish, E., North Adelaide	69	127
Craig Bros., Hackney	93	177
Uren, Mrs. P. A., Kapunda	126	362
Perry, Wm., Murrumbidgee, Victoria	64	173
Nancarrow, J. T., Port Adelaide	56	134
Bertelsmeier, C. B., Clare	76	225
Tockington Park Poultry Farm, Grange	98	242
Trenwith, T. H., Kadina	50	108
Knappstein & Bray, Clare	55	94
Whitegate Poultry Farm, No. 2, Deepdene, Victoria	82	164
"Deneshollow," Caulfield, Victoria	105	172
Hill, Chas., Monarto South	64	113
"Islay," East Malvern, Victoria	78	155
Gosh, A. J., Burnside	98	215
Indra Poultry Farm, Freeling	61	137
Whitrow, A. J., Knoxville	74	206
Hall, T. C., Rose Park	113	204
Ontario Poultry Farm, Clarendon	84	216
Howlett, H., Moonta	38	146
"Koonoowarra," Enfield	127	286
Hall, A. W., South Oakleigh, Victoria	75	259
Convent of the Good Shepherd, Oakleigh, Victoria	57	117
Carne, E. A., Kangaroo Flat, Victoria	86	204
Navan Poultry Farm, Minlaton	56	140
Lillywhite, R. G., Fullarton	70	199
Gibbs & Pine, Queenstown	64	74
Hughes, J. J., Elsternwick, Victoria	66	67
Shamrock Poultry Farm, Perth, W.A.	39	131
Bertelsmeier, C. B., Clare	60	117
Nancarrow, J. T., Port Adelaide	57	157

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

Robertson, F. H., Northam, W.A.	57	114
McKenzie, E., Northcote, Victoria	57	137
Mitchell, B., Bendigo, Victoria	50	90
Provis, W., Eudunda	22	94
Kenway, D., West Pennant Hills, Sydney	110	168
Cowan Bros., Burwood, N.S.W.	109	195
Kenmore Poultry Farm, Dandenong, Victoria	10	48
Brundett, S., Moonee Ponds, Victoria	43	96
Cant, E. V., Richmond	34	108

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended June 30th.	Total Eggs Laid from April 1st, 1912, to June 30th, 1912.
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SECTION II.—HEAVY BREEDS—Continued.

BLACK ORPINGTONS—Continued.

Craig, Mrs. C., Hackney	72	90
Lampe, B., Kadina	85	122
Wirraparinga Poultry Yards, Plympton	85	134
Phillips, A., Portland, S.A.	47	55
Martin, B. P., Unley Park	52	162
Nancarrow, J. T., Port Adelaide	25	25
Padman, J. E., Plympton	84	226
Francis Bros., Fullarton	28	33
Hall, T. C., Rose Park	116	209
Tockington Park Poultry Farm, Grange	43	67
Bertelsmeier, C. B., Clare	54	135
Craig Bros., Hackney	76	195
Bertelsmeier, C. B., Clare	15	89

SILVER WYANDOTTES.

Dunn, I. F., Keswick	63	166
Tidswell, H. J., Mitcham Park	69	232
Moses, S., Blyth	24	127
Perry, Wm., Murrumbidgee, Victoria	60	72
"Denehollow," Caulfield, Victoria	59	129
Western, F. C., Marion	117	231

SALMON FAVEROLLES.

Courtenay, K., Mordialloc, Victoria	40	182
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LANGSHANS.

Stevens, E. F., Littlehampton	82	178
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PLYMOUTH ROCKS.

"Koonoowarra," Enfield	29	53
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SECTION III.—SCRATCHING SHED SECTION.

WHITE LEGHORNS.

Sickert, P., Clarence Park	80	207
Tomlinson, W., Clarence Park	95	266
Moritts Bros., Kalangadoo	65	195
Codling, H., Mitcham Park	56	168
Sargent's Poultry Yards, East Payneham	75	176
Purvis, W., Glanville	59	185
Bertelsmeier, C. B., Clare	75	206
Padman, A. H., Hyde Park	111	274
Hooking, E. D., Kadina	61	159
Readnall Bros., Gawler	68	111
Brain, J. H., South Yan Yean, Victoria	25	86
Provis, W., Eudunda	74	210
Redfern Poultry Farm, Caulfield, Victoria	79	224
Broderick, P. J., Gawler	85	98
"Koonoowarra," Enfield	61	96
Lillywhite, R. G., Fullarton	49	152
Coak, A. J., Burnside	71	165
Indra Poultry Farm, Freeling	47	157
Whitrow, A. J., Knoxville	48	133
Tockington Park Poultry Farm, Grange	64	204

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended June 30th, 1912.	Total Eggs Laid from April 1st, 1912, to June 30th, 1912.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS (except where otherwise notified).

Glenelg River Poultry Farm, Mount Gambier	169	266
Dow, A., Glencoe West	120	273
McNamara, Mrs., Mount Gambier	71	175
Moritz Bros., Kalangadoo	127	343
"Mahama," Mount Gambier	115	211
Holmes, F. A., Frances	118	262
Sudholz, A., Kalangadoo	108	157
Staunton, S., Naracoorte	79	182
Hall, C. W., Mount Gambier	101	215
Moritz Bros., Kalangadoo	116	301
Vorwerk, K. E., Millicent	118	195
Vorwerk, H. F. & A. C., Millicent	101	231
Jarrad, J., Mount Gambier	111	175
Bartram, T. A., Kybybolite	129	284
Vorwerk, H. F. & A. C., Millicent	105	215
Jenkins, R. D., Kybybolite	55	117
Arthur, J. S., Bordertown	99	239
Drake, C., Naracoorte	124	228
"Eurinima," Kybybolite	110	238
Smith, M., Hynam	91	184
Lacey, F. C., Kybybolite	138	357
"Hardsfield," Mount Gambier	136	309
Blue Lake Poultry Farm, Mount Gambier	101	162
Beaton, W. J., Tantanoola	88	193
Bennett, E., Kalangadoo	45	82
Jones, H. F., Mount Gambier	79	110

MINORCAS.

James, S. T., Mount Gambier	31	54
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SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

"Hardsfield," Mount Gambier	92	121
Blue Lake Poultry Farm, Mount Gambier	72	132
McNamara, Mrs., Mount Gambier	36	80

SILVER WYANDOTTES.

Moritz Bros., Kalangadoo	59	182
Osborne, W. F., Kalangadoo	87	165

PLYMOUTH ROCKS.

Bishop, B., Mount Gambier	2	2
Glenelg River Poultry Farm, Mount Gambier	42	72

NOTES ON EGG-LAYING COMPETITIONS.

ROSEWORTHY AND KYBYBOLITE POULTRY STATIONS.

The results to date have been satisfactory. The moult, which seems inevitable in all competitions which begin in April, has been less severe than in former years. The birds are now all practically through the moult, and laying will improve rapidly. The results at Kybybolite, where all the birds are confined in scratching shed houses, are excellent. The birds in the scratching-shed houses at Roseworthy have not laid as well as was expected; the final results must, however, be considered before any definite opinion can be expressed; and, further, the results of one year cannot be accepted as conclusive. The South-Eastern station is close to the railway, and is more conveniently situated than is Roseworthy. Were the latter station in a more accessible position the number of visitors would be very large increased.

ROSEWORTHY.

The Superintendent reports—The general appearance and health of the birds is good. A few individual cases of light moult are still noticeable. Laying has been maintained, and averages are fair for the period. One White Leghorn in section 1, and four hens in section 2, have been broody. One hen in section 1 was found dead in the house. The temperatures for the month have been as follows:—Average maximum, 62.55°; average minimum, 43.3°; rain, 1.55in. There was wind on 14 days, chiefly south-east and south-west. The highest reading recorded was 73.2°, while the lowest was 31.3°. The winds generally were of a very cold nature.

KYBYBOLITE.

The Superintendent reports—The month of June for 1912 has been much colder than that for June of 1911, but the egg-production has been the best we have yet had for any month of June. This all goes to point out the value of the scratching-shed house in the South-Eastern districts, though as yet there has not been any experience of a large number of birds in any one house. Backward birds are still to be seen, and there is one pen that has hardly commenced to lay. The general health has been good. One bird died in section 2; this was due to troubles of the oviduct. The nights have been bitterly cold, as also have a good many days, especially towards the end of the month. The minimum temperature was 28°, and maximum 64°.

D. F. LAURIE, Poultry Expert and Lecturer.

ANALYSES OF FERTILISERS.

The following are further results of analyses made by the Government Analyst (Mr. W. A. Hargreaves, M.A.) of samples of fertilisers taken since the beginning of the year.

Name.	Phosphate.						Nitrogen.	
	Water Soluble.		Citrate Soluble.		Phosphoric Acid, calculated as Tricalcium Phosphate.		Result of Analysis.	Vendor's Guarantee.
	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.		
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Mount Lyell Mining and Railway Co., Limited—								
“Mt. Lyell standard super” (from J. Bell & Co.’s store at Jamestown)	37.50	38.00	—	—	—	—	—	—
“Adelaide super” (from J. Bell & Co.’s store at Jamestown)	36.63	30.00	—	—	—	—	—	—
Cave & Co.—								
“Centaur bonedust” (from store at Edithburgh)	—	—	—	—	43.85	45.00	3.52	3.00

GEO. QUINN, Inspector of Fertilisers.

BEES AS FERTILISING AGENTS.

EFFECT ON FLOWERS AND FRUIT.

By T. E. WHITELAW, Inspector of Apiaries.

Any person who is a beekeeper, and is thoroughly acquainted with the practical and scientific data governing bee life, can only come to one conclusion regarding the true work that bees perform in the world of nature. They are essentially one of the principal agents for the fertilisation of flowers that depend on insect visitors to perform the act of pollination. Without efficient pollination such blossoms will not produce fertile seed. Other insects, such as butterflies, moths, and flies aid in the execution of this work. In countries possessing a congenial climate and an abundance of insect life, efficient fertilisation is readily accomplished. Bees do the greatest work in this direction, owing to the multitude of their numbers, the regularity of their visits, and the fact that they actually gather the fertilising dust pollen with which to feed themselves and their young.

The fertilisation of flowers by bees is inadvertent, following on the direct quest of the latter for pollen and nectar. The scents and hues of the blossoms are the lures to the feast, and the essential organs of the flowers are so disposed that the insects become dusted with pollen grains while they sip the nectar. Pollen is the fecundating element in flowers, so that when the dusted insect busies itself among the blossoms, carrying from and leaving pollen grains on the essential parts, its work as an agent of fertilisation is very great. The gathering of nectar is only an incidental portion of their work, of which the beekeeper gains the advantage. So far as my knowledge extends, I am unaware that the secretion of nectar is of any benefit to the plant or blossom, beyond the fact that it is the bait that tempts fertilising insects to carry the pollen from flower to flower. If nature makes this provision to attract insects, it is evident that efficient fertilisation is necessary for the wellbeing of the plant, and that mankind can assist by ensuring a plentiful supply of such insects.

Darwin states that in Australia difficulty was experienced in obtaining fertile seed from certain types of red clover until certain wild bees of the *Bombus* species were imported. The writer of this article was at one time engaged in collecting bees to be used for this purpose in New Zealand. The

fact that many plants bear both sexual organs in the same flower makes it a natural conclusion that they would be self-fertilised. Investigation, however, reveals that nature has wisely made provision tending to prevent such in-breeding. The formation of such flowers is so cunningly and wonderfully constructed that self-fertilisation is prevented. The works of Charles Darwin on the cross and self fertilisation of plant life are interesting as elucidating problems of this character. Bees are inclined to visit flowers that are brilliantly colored, or of a prominent structure, and it is found that such blossoms are built in a manner so as to prevent self-fertilisation. They are especially adapted so as to secure pollen from another flower of the same species, and in many instances through the medium of insects.

Other plants carry the sexual organs on separate blossoms, and it is absolutely essential that some outside medium should be adopted for the safe conveyance of pollen. The bee is a humble instrument for the performance of such a task. The common marrow and cucumber are plants of this description. In other varieties of flowers the male and female organs develop at different times, so that self-fertilisation is rendered difficult.

If bees perform an important part in the production of fertile seed it is also reasonable to conclude that some consideration must be taken of the work they do in the matter of fruit production. Fruit is simply the protective envelope surrounding the seed. A fruit tree that blossoms profusely will not necessarily bear a proportionate quantity of fruit. It is essential that the blossoms should be "set," or, in other words, fertilised. The average orchardist would do well to study the methods of ensuring the safe fertilisation of his fruit blossom. It is worthy of his consideration.

Mr. W. F. Reid, in a paper read before the Society of Arts in London, stated that a large grower of bush fruit established an apiary in his orchards, and found that by so doing his produce increased fourfold. As he sent off several tons of gooseberries during the season, the money value of his bees is not to be estimated by the yield of honey alone, although this is also considerable.

The blossom of the apple possesses five stigmas, each of which must be fertilised to produce a fully-developed apple, strong and true to shape. Each of these stigmas corresponds with a division of the future fruit. By cutting a transverse section of a fruit these divisions can be seen in the core, which in shape resembles a five-pointed star. The apple is *pseudo syncarpous*; being practically five fruits in one, and requires for its perfect production five independent fertilisations in the blossom. If the fertilisations are barren, the calyx, instead of developing to fruit, dries, and eventually drops off. Should three or four fertilisations occur, the apple will develop imperfectly, with a kink or hollow at that portion of the apple which was not fertilised. In a transverse section of such an apple the dissepiment opposite the unde-

veloped portion will be found to contain shrivelled, unfertile seeds or pips, or possibly none at all. The imperfect fertilisation has retarded the development of the fruit. Apples of this character do not possess the same strength as those properly matured, and are unable to withstand heavy winds; they readily become "windfalls." Mr. F. Cheshire, F.L.S., when testing this matter, visited an orchard after a gale of wind and gathered 200 apples promiscuously, for a lecture illustrative of this point. Of these 200 apples the cause of falling in every case, with the exception of eight, was traceable to imperfect fertilisation.

Mr. I. Hopkins, Apiculturist to the New Zealand Department of Agriculture, says—"In the winter of 1882 I started a bee farm at Matamata, and had 100 hives of bees when the fruit-blooming season came on. The apiary was located close to a mixed orchard of large trees, covering some 10 acres. The nearest bush was about five miles distant, and, the orchard being in an open plain, there was no shelter for wild bees nearer than the bush, so that it was not at all likely the orchard was visited by many bees. I was informed that though the trees blossomed abundantly each season, the trees bore very little fruit, and that the whole 10 acres did not supply enough for the station. The result in that and subsequent seasons, by the aid of my bees, was that the trees had to be propped up in many instances to keep them from breaking down under the weight of fruit."

Professor L. O. Howard, of the Department of Agriculture, U.S.A., writes regarding bees and bee culture—"This branch of agricultural industry does not impoverish the soil in the least, but, on the contrary, results in better seeds and crops. The total monetary gain to the country from the prosecution of this industry would undoubtedly be placed at several times the amount given in the above table (\$20,000,000) were we only able to estimate in dollars and cents the result of bees in cross-fertilising the blossoms of fruit crops."

The writer at one time was running an experimental apiary for scientific research in a district noted for its fruit production. Among the data recorded daily was the temperature, the rainfall, the hours of sunshine, the blossoming of the various bee flora, and lastly the fading of the blossoms. A test was made of the value of the bees visiting the fruit blossom in the following fashion:—A prediction was made of the probable fruit crop by carefully comparing the above data. It was seen that the cherries were flowering during a period of fine sunny weather, which permitted the bees to fertilise the bloom, and a good crop was predicted. Where, however, adverse weather was experienced a reverse prediction was made.

Towards the end of the fruit blossom a prophecy was drawn up of the various fruit crops, and handed to one of the largest orchardists in the district without revealing the method of compilation. The result was a broad smile, but a

promise was extracted that it would be preserved and tested with the actual results. At the end of the fruit season the same orchardist was making earnest inquiry as to the method of compilation, as it had been quite correct, with the exception of one instance. The error in this case was due to a frost having been recorded in the orchards, which were situated at a higher altitude than the apiary, where it had not been severe. This frost had pinched the gooseberries, and a poor crop resulted where a good one had been predicted. This fruitgrower eventually became a beekeeper, so impressed was he with the value of bees to the orchardist. During ensuing seasons these predictions were in constant demand in the district, and their reliability when carefully compiled were surprising and convincing.

Some years ago a Massachusetts beekeeper was forced to shift his bees to another district, as neighboring fruitgrowers said they were a nuisance. But after a year or two had passed they were glad to welcome the bees back again, because so little fruit was set on the trees in comparison with the amount of blossom. The upshot was that the beekeeper was recalled, and, as was expected, not only more fruit but more perfect fruit development followed.

The point as to whether it is advantageous or not to have plenty of bees in the orchards at the period of blossoming is one which is well worthy of study and consideration. Mr. J. C. Hagger (Orroroo), at the Annual Conference of Upper Northern Branches of the Agricultural Bureau, mentioned that he had saved lucerne seed for resowing, but the germination had only been about 5 per cent. It would be interesting to learn whether there had been sufficient facilities in his district to ensure the safe fertilisation of his lucerne blossom.

[The above article was received from Mr. Whitelaw some months ago but was held over, its publication being deemed more suitable to this season of the year.—ED.]



Yarley Apiary, Eyre Peninsula.

THE WHEAT MARKET.

There was but little variation in prices on the local wheat market during June, although the good rains experienced caused holders to quit more freely. There is now, it is reported, comparatively little grain left for export. The English market was very firm during the first part of the month, but subsequently there was a reaction, and the latest advices at the time of writing were that the market was quiet, with but little demand.

Dealing with the wheat position on May 31st, *Beerbohm's Evening Corn Trade List* states:—"There is no particular change in the prospects of European crops; if anything, they have slightly improved, the weather, both in importing and exporting countries, having been, on the whole, quite favorable. With ordinary agricultural conditions in the future the harvest in France promises to be an early one, and this is an important point, as, if such should prove to be the case, the French demand will probably be only a moderate one; but any delay in the arrivals of new wheat, with reserves so small, would mean a good deal of wheat being imported. With regard to the North American crop, reports are somewhat conflicting, but point to winter wheat prospects being rather less favorable than a week or two ago. On the other hand, the present outlook for spring wheat, both in the United States and Canada, is a very favorable one, and if these important crops meet with no serious mishap they may give yields which will make up for the shortage in winter wheat. Two or three months must elapse, however, before spring wheat will be safe. The 'visible' in the United States experienced a further sharp decrease last week, but receipts at Winnipeg were sufficiently large to keep the Canadian figure about unchanged, and still considerably in excess of last year's quantity; recent receipts continue to grade much better than earlier in the season, although there is still a fair proportion grading below No. 4.

"The final official crop report for the whole of India has now been received, the yield being estimated at 45,800,000 quarters, against 46,300,000 quarters last year, or 500,000 quarters less than in 1911. The crops and exports of the past eight years have been as follows (in quarters of 480lbs.):—

	Crop—Qrs.	Exports following 12 months—Qrs.
1912	45,800,000 ..	?
1911	46,300,000 ..	6,065,000
1910	44,600,000 ..	5,860,000
1909	35,375,000 ..	4,635,000
1908	27,880,000 ..	485,000
1907	39,000,000 ..	3,975,000
1906	40,000,000 ..	3,590,000
1905	35,000,000 ..	4,250,000
1904	44,700,000 ..	10,035,000
Yearly average, 1904/1911	39,107,000 ..	4,862,000

Making due allowance for increased home consumption, it would appear pretty certain that there must still be fairly important reserves of old wheat in India, and there can be little doubt that India could spare considerably more than the quantity exported in the 12 months ended March 31st, 1912, provided the wheat is wanted and prices are sufficiently attractive."

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
June 8	Very firm, held higher; Jan.-Feb., 5/0½; Liverpool firm, March-April, 4/11½	4/- Do.	4/3 4/2½ to 4/3	4/3 4/2½ to 4/3
10	—	Do.	Do.	4/1½ to 4/2½
11	Very firm, dearer; Jan.-Feb., 5/1½; March-April, 4/11½; April-May, 4/11½	Do.	4/1½ to 4/2½	Do.
12	3d. to 6d. advance asked April-May, 4/11½; Liverpool, Feb.-March, 5/0½	Do.	Do.	4/1 to 4/2
13	Firm, and 3d. to 6d. dearer, which checks business; Liverpool quiet	Do.	4/1 to 4/2	Do.
14	Very firm, Feb.-March, 5/1½; Liverpool, March-April, 5/0½	Do.	Do.	Do.
15	Firmly held, inactive; Liverpool, steady, but quiet	Do.	Do.	4/2 to 4/2½
17	—	Do.	4/1½ to 4/2	Do.
18	Steady, but quiet; Australian off coast, 5/3½; Liverpool firm, but no demand	Do.	Do.	Do.
19	Steady, quiet, off-coast buyers at 5/3½; April-May bought at 5/0½	Do.	4/2 to 4/2½	Do.
21	Steady, but quiet; April-May, 5/0½; Liverpool, firm, quiet	Do.	4/1½ to 4/2	Do.
21	Steady, but quiet; March-April, 5/2½; Liverpool, firm, quiet	3/11 to 4/-	Do.	Do.
22	Quiet; Liverpool, steady, but quiet	Do.	Do.	Do.
24	—	Do.	Do.	Do.
25	Very dull, lower, Australian arrived 5/2	Do.	Do.	Do.
26	Steady, but quiet	Do.	Do.	Do.
27	Quiet, off coast, 5/2½; Liverpool steadily held, inactive	Do.	Do.	Do.
28	Steady, but quiet; Liverpool easier tendency	Do.	Do.	4/2
29	Quiet	Do.	4/1½	Do.
July 1	—	Do.	Do.	Do.
2	Steady, but quiet	Do.	Do.	Do.
3	Very dull; Liverpool dull with easier tendency	Do.	Do.	Do.
4	Quiet, no demand	Do.	Do.	Do.
5	Weak	Do.	Do.	Do.

STEAMER FREIGHTS.—(July 4th)—Steamers from South Australia to United Kingdom-Continent, full cargo rates 34s. per ton (11½d. per bush.) nominal. Parcels. Port Adelaide to London-Liverpool or Continent, 22s. 6d. per ton (7½d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SAILER FREIGHTS.—From South Australia to United Kingdom-Continent, 30s. per ton (9½d. per bush.) nominal; to South Africa, 25s. to 27s. 6d. per ton (8d. to 8½d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for June, 1912, at the undermentioned stations, also the average total rainfall for the first six months in the year, and the total for the first six months of 1912 and 1911 respectively:—

Station.	For June, 1912	Average to End June.	To End June, 1912.	To End June, 1911.	station.	For June, 1912.	Average to End June.	To End June, 1912.	To End June, 1911.
Adelaide	3.80	10.11	7.60	7.07	Hamley Bridge	2.04	8.02	3.43	6.97
Hawker	2.57	5.83	4.74	3.51	Kapunda ...	2.23	9.11	3.91	8.13
Cradock	1.09	5.42	2.49	2.88	Freeling	2.04	8.39	3.94	7.39
Wilson	1.97	5.83	4.77	2.46	Stockwell ...	2.77	9.32	4.84	8.78
Gordon	1.14	8.05	3.10	2.69	Nuriootpa ..	2.35	9.80	4.46	7.19
Quorn	3.03	6.37	7.15	3.01	Angaston ...	3.85	9.82	6.39	10.83
Port Augusta	1.74	4.85	4.04	4.34	Tanunda	3.63	10.26	7.26	12.34
Port Germein	1.94	6.27	3.36	5.37	Lyndoch ...	3.18	10.41	6.09	9.21
Port Pirie ..	2.32	6.47	3.49	6.91	Mallala	2.41	8.24	4.12	6.88
Crystal Brook	2.93	7.17	4.94	7.48	Roseworthy ..	1.52	8.33	3.92	6.68
Pt. Broughton	2.31	7.02	5.47	7.73	Gawler	1.87	9.15	4.25	7.39
Bute	1.86	7.27	3.96	9.06	Smithfield ..	2.55	8.26	4.64	8.03
Hammond ...	1.65	5.22	3.14	6.27	Two Wells ...	1.71	8.37	3.72	5.88
Bruce	2.17	4.30	4.07	2.54	Virginia	1.82	8.64	4.03	6.91
Wilmington ..	4.60	8.24	8.10	7.48	Salisbury ...	2.92	9.03	5.36	9.19
Melrose	5.01	10.84	7.97	8.44	Teatree Gully	5.16	13.91	9.02	10.58
Booleroo Cntr	2.58	7.32	4.08	5.11	Magill	4.50	12.77	8.37	10.23
Wirrbarra ...	4.03	8.67	6.04	6.09	Mitcham	4.62	11.60	7.02	9.09
Appila	2.96	6.86	8.25	6.18	Crafers	6.58	21.79	13.02	21.68
Laura	2.85	7.90	4.29	7.41	Clarendon ...	4.74	16.13	9.14	15.50
Caltowie	2.26	7.63	3.94	8.48	Morphett Vale	3.51	11.45	6.06	9.92
Jamestown ...	3.72	7.59	6.30	9.21	Noarlunga ...	3.35	9.84	5.60	10.36
Gladstone ..	2.38	7.06	3.85	8.33	Willunga ...	3.87	12.22	7.46	13.68
Georgetown ...	3.08	8.50	5.26	8.68	Aldinga	3.06	10.11	5.30	9.00
Narridy	3.20	7.95	5.03	8.68	Normanville ..	2.83	10.00	5.08	9.61
Redhill	3.09	7.77	5.55	7.34	Yankalilla ...	3.28	11.51	6.57	11.31
Koolunga ...	2.82	7.31	4.69	7.22	Eudunda	3.03	7.77	5.74	7.83
Carrieton ...	1.95	5.52	3.29	3.82	Sutherlands ...	2.05	—	4.24	5.03
Eurelia	2.82	5.99	4.76	4.57	Truro	3.66	8.74	6.34	8.73
Johnsburg ...	2.79	4.41	4.33	3.30	Palmer	2.58	—	4.51	5.77
Orroroo	2.71	6.59	4.55	3.83	Mt. Pleasant.	3.16	12.47	5.44	11.19
Black Rock ..	2.45	5.80	3.64	4.95	Blumberg ...	3.22	13.93	6.26	11.55
Petersburg ...	2.74	6.04	5.06	5.94	Gumeracha ...	3.81	15.42	7.84	14.35
Yongala	2.34	6.23	3.81	5.96	Lobethal ...	3.35	16.46	7.39	14.92
Terowie	2.56	5.95	4.31	5.99	Woodside ...	3.21	14.26	6.97	14.05
Yaroowie ...	2.72	6.18	4.90	6.55	Hahndorf ...	3.15	16.03	6.78	17.87
Hallett	2.92	7.25	4.55	7.14	Nairne	2.66	13.27	6.01	16.27
Mount Bryan	2.58	7.01	4.45	6.32	Mount Barker	3.21	13.91	6.60	15.34
Burra	3.80	8.10	5.77	8.08	Echunga ...	4.17	15.32	8.39	18.01
Snowtown ...	2.74	7.38	5.19	5.54	Macclesfield ..	3.24	13.40	6.80	15.34
Brinkworth ..	3.18	7.05	4.81	7.24	Meadows ...	5.09	16.34	9.40	18.35
Blyth	2.24	7.77	4.53	7.44	Strathalbyn ..	1.93	8.76	5.50	10.13
Clare	3.62	11.11	6.99	11.18	Callington ...	1.65	7.15	3.22	7.19
Mintaro Cntrl.	2.35	9.93	4.53	9.71	Langehorne's B.	1.93	7.06	3.83	6.74
Watervale ...	3.51	12.72	6.93	12.03	Milang	1.67	8.24	3.91	5.09
Auburn	2.23	11.08	5.07	11.23	Walleroo ...	3.25	7.12	5.79	8.43
Manoora ...	1.93	8.34	4.32	7.12	Kadina	2.78	7.94	5.53	7.34
Hoyleton ...	1.79	8.80	3.10	8.62	Moonta	2.18	7.81	5.28	6.77
Balaklava ...	1.63	7.81	3.20	7.79	Green's Plains	2.05	7.53	3.72	5.85
Pt. Wakefield	1.82	6.82	3.97	9.83	Maitland ...	2.31	9.87	5.03	10.20
Saddleworth	1.87	9.48	4.06	7.42	Ardrossan ...	1.85	6.87	4.51	6.86
Marrabel ...	1.59	8.95	3.16	6.18	Pt. Victoria ..	1.89	7.68	4.80	8.79
Riverton ...	2.25	9.64	4.19	9.05	Curramulka ..	1.22	8.82	3.88	8.15
Tarlee	2.17	8.31	4.26	6.90	Minlaton ...	.90	8.48	3.42	7.45
Stockport ...	1.63	7.70	3.51	5.88	Stansbury ...	1.77	8.07	5.10	8.30

RAINFALL TABLE—*continued*.

Station.	For June, 1912.	A'ge. to End June.	To End June, 1912.	To End June, 1911.	Station.	For June, 1912.	A'ge. to End June.	To End June, 1912.	To End June, 1911.
Warooka ...	1.29	8.23	4.07	9.94	Bordertown .	2.65	8.96	4.19	8.04 *
Yorke town .	1.37	8.34	4.69	8.23	Wolseley ...	2.72	8.00	3.87	8.37
Edithburgh .	1.47	8.07	4.32	7.00	Frances	3.29	8.67	5.88	11.03
Fowler's Bay	2.40	6.55	5.49	5.87	Naracoorte .	2.82	10.05	6.60	11.38
Streaky Bay	3.52	7.70	5.87	8.39	Lucindale ..	2.57	10.28	6.98	12.92
Pt. Elliot .	3.09	8.00	5.72	9.44	Penola	2.12	11.92	9.50	13.88
Pt. Lincoln..	2.64	9.56	9.06	8.76	Millicent ...	2.64	13.77	9.61	18.05
Cowell	1.69	5.86	5.78	6.25	Mt. Gambier.	2.97	14.18	11.33	17.77
Queenscliffe .	1.56	18.92	5.35	—	Wellington .	2.26	7.28	3.92	7.05
Port Elliot .	2.09	9.89	5.69	8.06	Murray Bdg.	2.41	6.75	3.44	5.85
Goolwa	2.47	8.47	6.39	9.03	Mannum ...	2.06	5.83	3.10	3.33
Meningie ...	1.89	8.92	4.90	7.56	Morgan	2.15	4.35	3.81	4.47
Kingston....	4.98	11.70	11.03	11.70	Overland Crnr.	3.36	5.44	4.42	6.70
Robe	2.41	—	7.09	13.43	Renmark ...	3.00	4.89	4.21	6.59
Beachport...	2.44	13.05	7.65	16.54	Lameroo ...	4.99	—	6.55	—
Coonalpyn ..	3.09	7.91	5.29	8.05					

TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of over 6,000 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on July 1st—

BUTTER.

There has been a falling off in the supply of cream this month, and in consequence the price of butter is still high, viz., superfine 1s. 6d., and pure creamery 1s. 4½d. The beneficial rains experienced during the last few days will no doubt have a marked effect upon the supply of cream, and there is every possibility that a reduction in prices will follow.

A. W. Sandford & Co., Limited, report on July 1st—

BUTTER.—After the long dry autumn splendid rains have been recorded during the month, but it is too early yet for any effect to have been experienced on quantities of butter and cream. Active sales ruled throughout June, so that prices have kept fairly even. Best factory and creamery butter, fresh in prints, sold as high as 1s. 5d. to 1s. 6d. per pound, and closed at 1s. 4½d. to 1s. 5½d.; choice separators and dairies, 1s. 2½d. to 1s. 3½d.; store and collectors', 1s. 1d. to 1s. 1½d. per pound.

EGGS.—With increasing supplies values have eased somewhat. Prime guaranteed new-laid sold at 1s. 3d. per dozen; duck, 1s. 3½d.

CHEESE.—Brisk business has been experienced, and prices receded a little; but at late rates trade is good. Quotations, new make, 9½d. to 10d. per pound; matured, up to 10½d.

BACON AND HAMS.—With a good turnover prices improved slightly, even in face of the rather shorter demand that is usual during the winter months. Best factory-cure sides, 7½d. to 8½d.; hams, 7½d. to 8½d.

HONEY.—Prime qualities are scarce. For these the demand is exceptionally good, though for medium lots or discolored parcels sale is slower. Values—Prime, 3½d. to 3¾d. secondary, 2d. to 2½d.; beeswax, 1s. 2½d.

ALMONDS.—The quantities offering have not been extensive, but the demand continues brisk for both local and export trade. Brandis, 6d. to 6½d.; mixed soft-shells, 5½d.; kernels, 1s. 2½d.

LIVE POULTRY.—The market throughout the month has been very animated, local buyers and export traders purchasing largely, the result being that values throughout have been very satisfactory to consignors. Good table roosters brought 3s. to 3s. 6d. each; plump cockerels, 2s. 3d. to 2s. 9d.; hens and light cockerels, 1s. 8d. to 2s. 2d.; ducks, 2s. to 3s.; geese, 4s. to 5s.; pigeons, 6½d.; turkeys, 6½d. to 10½d. per pound live weight for medium to good table sorts.

POTATOES.—Larger quantities of Gambiers have come forward, and trade has been good throughout the whole of June, values keeping steady. Quotations, £5 5s. to £5 15s. per ton on trucks, Gambier.

ONIONS.—Prices continue firm, and the market is practically being supplied with Gambiers and Victorians; quotations remained stationary until the end of the month, when a sudden firming took place here in sympathy with an improvement in rates in Victoria. Quotations, £12 10s. to £13 10s. per ton on trucks, Gambier.

CARCASS MEAT.—Increased quantities have been coming along, but the demand has readily cleared all offering, especially well-fed and nicely-dressed stuff; heavy and rough sold accordingly. Good baconers and handy size shop porkers brought 5½d. to 6½d. per pound; heavy and poor stuff, 2d. to 3d.; nice dairy veal from 3d. to 4½d. per pound.

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		July.	August.			July.	August.
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Appila-Yarrowie	*	—	—	Koppio	1291	25	22
Arden Vale & Wyacca	*	—	—	Kybybolite	*	25	22
Arthurton	*	—	—	Lameroo	1296	—	—
Balaklava	1284	—	—	Leighton	*	—	—
Beetaloo Valley	1282	—	—	Lipson	*	—	—
Belalie North	1283	27	24	Longwood	1304	24	28
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Bowmans	*	25	22	MacGillivray	1304	—	—
Bute	*	22	—	Maitland	†	4	8
Butler	*	—	—	Mallala	1288	1	5
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Hartley	1302	27	24	Pailla Wall	1298	—	—
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Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings	
		July.	August.			July.	August.
Port Broughton	*	25	22	Waikerie	*	—	—
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Port Germein	†	6	—	Watervale	*	—	—
Port Pirie	*	6	3	Wepowie	1280	—	—
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Benmark	*	—	—	Willowie	1281	19	16
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Saddleworth	*	19	16	Wilmington	1281	—	—
Salisbury	1288	2	6	Wirrabara	1282	—	—
Shannon	1293	—	—	Wirrega	1314	—	—
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Strathalbyn	†	29	26	Yadnarie	1294	27	24
Sutherland	*	—	—	Yallunda	*	—	—
Tatiara	*	—	—	Yongala Vale	*	27	24
Uraidla and Summert'n	1309	1	5	Yorketown	*	13	10
Utera Plains	*	27	24				

* No report received during the month of June.

† Only formal business transacted at the last meeting.

ANNUAL MEETINGS OF BRANCHES.

The majority of the Branches will now be holding their annual meetings and electing their officers. In such cases, unless some paper is read or discussion entered upon, the reports will necessarily be classed as formal.—[Ed.]

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Amyton, May 30.

(Average annual rainfall, 11jin.)

PRESENT.—Messrs. T. O'Donoghue (chair), T. Griffin, J. J. Cormack, R. Brown, L. H. Mills, S. Thomas, D. P. Aitken, T. Ward, W. E. Mills, W. Gum, M. Corcoran, D. Corcoran, A. Crisp (Hon. Sec.), and one visitor.

CO-OPERATIVE SHEARING.—The following paper was read by Mr. J. J. Cormack:—“Shearing sheep on the co-operative principle is a subject worthy of the careful consideration of pastoralists and farmers alike. In bringing it forward I wish it to be distinctly understood that I refer principally to the settled areas, more commonly known as the farming districts, where, especially of late years, mixed farming, i.e., dairying, the keeping of sheep, and the growing of cereals, has been carried on; and particularly so outside of Goyder's line of rainfall, where, owing to the uncertainty of the rainfall for cropping purposes, the keeping of sheep has in consequence been looked on by the farmer as his best and most reliable source of income. They supply meat for his home, lambs fit for export, and each year a good clip of wool which realises a very handsome cheque. Sheep depasturing on the farm assist in keeping down all rubbish, whereby the farmer is enabled, when the rainfall is not too scanty, to grow a clean crop of wheat. Hence, there is scarcely a farm on these northern plains which does not carry a flock of sheep. It has oftentimes occurred to me as passing strange that sheepfarmers have not ere this devised some scheme by which they could assist each other at shearing times, thereby avoiding a considerable amount of anxiety, which is always occasioned by individual shearing. I have given this matter serious thought, and I have come to the conclusion that this can be done by the flockowners forming themselves into a co-operative company and erecting a shearing shed and yards complete on a site centrally situated, where all the sheep within a radius of 20 miles could be shorn. Our wide roads and stock routes, which at shearing time carry abundance of feed, and the convenience of railway facilities, leave nothing to be desired. The sheepfarmer is frequently troubled to know where he can shear his sheep. After making a circuit of his dwelling and all his out-buildings he generally selects his horse stable, for the single reason that he considers it the most convenient to fix up for the purpose. The ends and side are already enclosed, and only a few tarpaulins are needed to make it complete. The manger, he thinks, is a first-rate place in which to put the fleeces until he has time to bale them. The yard, 30yds. square, adjacent to the stable, makes a splendid catching pen. Drafting is entirely out of the question. Despite the fact that he cleans his shed well for shearing purposes, a quantity of straw and manure gets amongst the wool. The general get-up of the clip is lacking owing to there being insufficient room for classing. These drawbacks very often render a good clip of wool of less value than it would be if treated under more favorable circumstances. The owner of sheep who has made ample provision for shearing has of late years been confronted with the difficulty of securing shearers at the proper time. In the North delays are dangerous, owing to the grass ripening in September. Hand

shearers are becoming scarcer each year owing to a large number taking to machine shearing and more favorable occupations. Very few young men are learning hand shearing. This shortage is beginning to be felt most acutely by the farmer who usually has his sheep shorn at home; and in passing I would like to point out that with very rare exceptions the shearing sheds and general accommodation provided for shearers on farms does not in any way comply with the rules of the Shearers' Union, and wherever union labor is employed these rules are rigidly enforced. The greatest difficulty with which the farmer who shears his sheep on the farm has to contend is the rain. His shed is not waterproof, and he has no place under which to put unshorn sheep. The least shower of rain stops shearing. In showery weather, through this and other drawbacks, the sheep are kept unusually long in the yards and in close proximity to the shearing shed, and knocked about so much that they generally lose condition. This is a serious matter at this particular time of the year. Hence it is that I recommend the adoption by the owners of sheep of a scheme on the co-operative principle. Every sheepfarmer who held shares would have an interest in the concern. The shearing shed could be erected on a site convenient to a town where proper accommodation, &c., could be obtained for shearers and shed hands. It should be close to a railway station to obviate long cartage of wool. The shareholders could elect a committee and officers. By this means a good batch of first-class shearers with a capable overseer and wool classers, if necessary, could be easily obtained. In a shed equipped with all conveniences, any number of sheep could be shorn. The cleanliness and care bestowed in the general get-up of the wool would result in a much better price to the grower than he obtains under present conditions. By systematic management flockowners would be enabled to bring their sheep to the shed to be shorn just as required. A farmer owning 600 sheep could have them shorn, the clip baled, and on truck for Adelaide within a day. Consequently the sheep would not suffer in any way through being yarded too long. There would be no losses of shorn sheep, and the great amount of anxiety and inconvenience which now besets the flockowners would become a thing of the past." In discussing the paper, Mr. Gum expressed the view that the scheme as outlined would be all right in the case of the farmer with a large flock, but there would be no benefit to the man with 100 sheep. Mr. Brown thought the principle should be given a trial. Hand shearing was better than machine shearing. Mr. O'Donoghue was strongly in favor of co-operative shearing. It would always be an easier matter to get a good team of shearers for the shed than it would be to get the men to go amongst the farmers.

Carrieton, May 31.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. J. Ormiston (chair), C. T. Fisher, F. Gates, W. Beerworth, J. W. Bock (Hon. Sec.), and one visitor.

IRRIGATION.—In a discussion on this subject attention was drawn to the fact that the majority of wells in this district yielded supplies of water heavily charged with magnesia, with the result that it was of little value for irrigation. Attempts had been made to utilise the water, but very little success had been met with.

WILD DOGS.—Considerable trouble was being experienced with wild dogs, which were very numerous in the district. Unless sheep were yarded at night it had been found that severe losses were sustained.

Coomooroo, June 3.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. E. Berriman (chair), J. Brown, W. Robertson, E. Hall, E. Brice, H. R. Brice, R. W. Robertson, and W. M. Robertson (Hon. Sec.).

HOW TO MAKE THE BUREAU MEETINGS MORE ATTRACTIVE.—The paper on this subject, printed on page 904 of the May, 1910, issue of the *Journal*, was read by the Hon. Secretary and discussed by members.

HORSES AND HORSE-BREEDING.—An interesting discussion relating to various points in connection with horse-breeding took place. Mr. J. Brown would only breed from high-class animals. He preferred the medium draught for farm work in this district, as they were much more active than the heavier class, and consequently stood the travelling better. Mr. Hall had some of both classes, and found that the medium draughts stood the work better. It was his intention, if the season continued dry, not to stint his mares this year,

as he thought it would be cheaper and far less risky to buy foals; and he advised members to do the same. Mr. W. Robertson would not miss a season with the mares. He thought horses were scarce enough now. It would be better to breed to suit local conditions. The Chairman put six of his mares to the horse last season and only got one foal. Mr. R. Brice thought that if the foals were to arrive about the end of February or the beginning of March they would have as good a chance as the spring foals, as this was generally a slack time of the year, and there would be plenty of green feed about when they were old enough to wean. He always worked mares to within a few days of foaling, as this kept them from getting too fat. They had lost several foals, and attributed it to the mares being over-conditioned. Mr. J. Brown was in favor of raking mares. He explained the process to members. It was a mistake to take a mare straight out of the team and put her to the horse. He always gave his mares a day's spell when the stallion visited them, and he had not experienced any difficulty in getting them in foal.

Dawson, May 25.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. E. W. Smart (chair), P. H. Baker, P. Quinn, T. R. Hughes, C. H. Meyers, and J. Nottle (Hon. Sec.).

FENCING.—The Chairman, in opening a discussion, said the first essential in connection with fencing was to get good posts. The best available timber in this district was the mallee. Pine timber was really the best for posts, but was very scarce. There were three varieties of mallee, viz., red, white, and black or swamp. Red mallee made a very tough post, but white mallee posts were easily broken when dry. In erecting a fence for cattle he preferred to have three plain wires and a barb, the barb wire to be the second from the top. Mr. Meyers did not believe in using large timber for posts, for they were liable to crack and the white ants got into them and would soon have them eaten away. There was very little to choose between red and white mallee. Sandalwood made a very good post, but it was hard to get in this district. Good strainers were necessary, and rather than struts he favored straining the top wire in each strain until the line was completed. The best time to cut posts was in the winter. Mr. Baker thought the best posts in this district were made from the hollow white mallee. He would not have a red mallee if he could get any other, as he had found the white ants took to them quicker than to any other timber. For a boundary fence he would use one wooden post and then two or three flat iron posts, 1½ in. x ½ in., with a barbed wire on top. Should a wooden post get broken another post could be placed on the side, and the fence would be just as firm as when erected. For division fences he would place one wooden post and then one dropper, and have the posts a good distance apart. The black or swamp mallee made a very good post if the bark were taken off. Mr. T. R. Hughes had tried different varieties of wood for posts, but found that none of them would stand longer than four or five years without being charred. He thought the land on which the timber had grown was the cause of this. Members thought charring dry posts a good idea. The Chairman had seen green posts put in the ground without being charred and they stood as long as any posts.

RABBIT DESTRUCTION.—Mr. Meyers had been experimenting with Finlayson and Cousins' poison and he found it very effective. In the case of one large burrow he had closed all openings but eight. He put half a jam tin of water, with carbide added, in each opening, and not a single hole had been opened since.

Hawker, June 4

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. G. H. Wright (chair), W. J. Pyman, A. E. Feineler, and J. Smith (Hon. Sec.).

GRADING SEED.—The advisableness of carefully grading seed wheat was discussed at length by members. Mr. Wright expressed the opinion that good would follow the co-operation of a number of farmers to purchase a grader. Mr. Pyman thought there were always a number of cracked grains in the wheat, and these could be cleaned from the seed by grading. He favored the suggestion of Mr. Wright, and thought that if it were carried into effect considerable saving would result. [The members of the Clarendon Branch have purchased a grader. See this issue.—ED.]

Hookina, May 25.

PRESENT.—Messrs. B. Sheridan (chair), B. Murphy, F. Stone, Madigan (Hon. Sec.) and two visitors.

CARE OF MACHINERY.—Mr. B. Sheridan read the following paper on this subject:—“The care of farm machinery is a matter that is often neglected. How often, on going on a farm, do you see machinery of all kinds standing about totally unprotected from the weather. This is a very big mistake, and one that can be easily rectified. A shed with an iron roof, and the sides built up neatly with stumps, will keep the rain off. All woodwork of the machinery should be well painted. Every farmer can do this himself with very little cost. Thoroughly overhaul and clean off all oil and grease as soon as possible after using machinery.”

Morchard, June 10.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. E. Kitto (chair), G. Parsons, G. Richards, W. Reichstein, H. Kupke, R. Jasper, R. Kitto, G. Rafferty, B. S. McCallum (Hon. Sec.).

CARE OF HARNESS.—The Hon. Secretary read a paper on this subject. The amount spent on harness, he said, would in the course of a few years aggregate a sum that would surprise farmers. The best harness only should be bought, and this should be given careful attention. Cleaning and oiling, together with the application of a dressing to keep out the effects of rough weather and sweat from the horse, were essential. For each horse the farmer should have good strong winkers, coupling, collar, hames, and backband, the cost of which would be about £2 10s. Wherever possible a separate compartment for the harness should be provided. If each horse's gear were hung behind him on a peg it would be handy; but there was the danger, especially when the flies were troublesome, of the harness being knocked down and trampled on. Collars should be relined whenever the lining was worn or torn. If the horse were provided with a well-fitting collar, however hard it became no trouble would be experienced with sore shoulders, so long as the horse was cleaned before being harnessed. When the shoulders of the horses became sore it was not necessary to cut the collars. A bran bag, folded lengthways and padded with horsehair, with no padding where the sore would touch, and a space left in the centre of the bag to go over the horse's neck, could be placed under the collar and tied. The alteration of the draught should also assist. As the horse drew a portion of the weight with its back when the draught was low, the backband was a great help. In the discussion which followed Mr. Reichstein said that unless leather was attended to and oiled well it would soon become brittle and break. Mr. G. Rafferty failed to see how a collar would last many years without relining. Mr. R. Kitto had a horse with very soft shoulders. The collar was lined and padded in places to fit the shoulders, and this prevented sores. A padded bran bag was not necessary. Mr. G. Richards considered new harness should be oiled before being used.

Orroroo, June 21.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. T. H. P. Tapscott, J. T. Northcott, J. C. Hagger, Cottrell, M. Forrester, and A. L. Brice (Hon. Sec.).

FRUIT GARDENS AND WINDBREAKS.—Members discussed matters relating to the care of fruit gardens, and the advisability of having hedges or windbreaks of some description. All agreed that some kind of hedge should be provided, especially if the garden were in an exposed position, as the wind was responsible for much loss through fruit being blown off the trees. Apples and pears were most subject to loss in this way. Mr. Tapscott mentioned the carob tree as a useful breakwind. It had a very thick foliage, but was rather a slow grower. Its fruit, a kind of bean, was readily eaten by stock. Members thought that a couple of rows of almond trees around a garden would be useful. This was undoubtedly the most profitable windbreak to have, especially in this part, where almond trees thrived so well. As a general rule too little attention was paid to protection for the fruit garden.

Quorn, June 1.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. R. Thompson (chair), Noll, Britza, McColl, Finley, Cook, Bury, Brewster, Shulze, and Patten (Hon. Sec.).

IMPORT DUTY ON SUPER.—A unanimous resolution protesting against the imposition of an import duty on manures was passed. Members regarded the proposal as distinctly alien to the best interests of the farming community.

HANDLING YOUNG HORSES.—The Hon. Secretary contributed a paper, in the course of which he stated that in breaking in a colt, after having caught the animal, he fastened the centre of a long rein around its neck and passed one end through either ring of the bit. After it had been circled round, first on the near side and then on the off, for about an hour, the colt should have the collar and hames put on, and the circling should be repeated. The best way of teaching the animal to lead was for one person to endeavor to lead him whilst another lightly touched him with a whip from behind, if it became necessary. In no case should the person with the whip speak to the animal. It could then be harnessed to a drag, and after half an hour's work, placed between two steady horses and driven for a while. After this it could be hitched to the plough or harrows, and little trouble should be experienced. It was necessary to get the animal at work as quickly as possible.

FALLOWING.—Mr. A. F. Noll read the following paper:—"The seeding finished, cultivate the land to be fallowed, as the seeds of weeds and wild oats covered slightly will germinate more freely. The ground will not set so hard when the weather gets dry, and it will be more easily ploughed afterwards. When the weeds and wild oats have come up nicely, plough the ground say to a depth of 4in. or 5in., according to the nature of the soil. After the next rain harrow it, and more weeds and oats will spring up. Care should be taken not to work the ground too wet. When a nice crop of weeds, &c., are up, the land should again be cultivated, and, following a rain, harrowed again to conserve the moisture. By working the land in this manner the fallow will be cleaned and moisture conserved."

MALTING GRAIN.—The following paper was also contributed by Mr. Noll:—"It is generally recognised that if wheat and superphosphate are drilled into the soil together, and are allowed to remain there for an indefinite period, perhaps for months, until sufficient rain falls to germinate the seed, the super. will cause the seed to malt, and the crop will come up very thin, despite the fact that a sufficient quantity of seed had been sown to insure a thick crop. In the South and Lower North some farmers go to the extra trouble of first drilling in the manure and afterwards sowing the seed, to keep it from coming into contact with the super. It does not seem to be generally known that an attachment is in the market which can be fitted to any make of drill which will sow super. and seed to different depths, thus preventing the seed coming into contact with the super. I have used the attachment for two seasons, and it has answered satisfactorily."

Wepowie, May 28.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. C. Halliday, J. Crocker, C. Knauerhase, G. Roocke, W. Hetzel, J. Reilly, J. E. and C. Pearce, J. Chrystall, T. F. Orrock (Hon. Sec.), and one visitor.

IMPORT DUTY ON SUPER.—The proposal to place an import duty on superphosphate was discussed at length, and members expressed the opinion that the suggestion was antagonistic to the interests of the farming community in general.

FARM MANAGEMENT.—The following paper was read by the Hon. Secretary:—"To manage a farm properly the farmer must take care of everything. There are horses, implements, sheep, fences, sheds, &c., all of which must be looked after. It is necessary to have plenty of strength according to the amount of land cultivated. A few spare horses are very handy for doing odd jobs about the farm without having to stop the main team. The farmer must have a supply of good harness. A strong set should be on hand for wagon purposes. A good horse can easily be spoiled with weak chains when it comes to a heavy pull. Harness should always be kept sufficiently oiled to keep it soft. Leather should never be allowed to remain out at night without being covered, and should always be kept in repair. Machinery and implements purchased should always be the most up to date and best as far as can be judged. It is a good idea to get advice about machinery from some person that has worked it rather than from an agent. A farmer should never attempt to cultivate more land than he can manage. A properly managed farm should have a good supply of water, if it is possible to procure it at any reasonable depth. Some farmers depend on dams, when they could obtain water by sinking. They cart water for months rather than spend money to get a supply by tapping a spring. No well-managed farm is without sheep. They help to clean off weeds, keep the farmer in meat, and considerably enhance the income. Some farmers only use five wires for a sheep-proof fence. In my opinion six are necessary. When sheep become

short of feed they naturally try to reach all they can through the wires, with the result that with a wide fence they are often able to get through. No farm should be without a blacksmith's shop. Much time and expense is saved by doing most of the blacksmithing on the farm. During slack times, or on wet days, a man can be kept busy repairing machinery, harness, reversing and sharpening shares, &c. Every machine should be overhauled and placed in a good shed as soon as possible after its season's work is done. All parts that require mending or renewing should be taken note of and the necessary repairs should be effected as early as possible. A glance around an implement and an occasional tightening of a nut or two often saves a breakage. In this district a farmer should have at least two years' supply of hay on hand to help him in dry seasons, as in some years there is very little fit to cut."

Willowie, May 29.

PRESENT.—Messrs. T. Hawke (chair), A. W. Howard, D. McCallum, S. Tucker, J. D. A. Stone, F. Bull, E. S. Bristow, S. McCallum, W. Greig, B. Bull, A. Basley, B. Schmidt, and one visitor.

TREE-PLANTING.—Mr. A. W. Howard contributed the following paper:—"Three utilities that are urgently required in this district are water conservation, railway facilities, and greater attention to the growing of trees. To prove the necessity of tree-planting one only has to take into account the vast areas, in fact whole country sides, that have been practically denuded of timber. In many cases a barren waste has resulted. Trees not only help to conserve moisture, but maintain a more even temperature and moist atmosphere. The rainfall of the district is quite sufficient for growing olives. These could be grown not only for the sake of beautifying the district, but also for their commercial value. As much as £20 has been secured from an acre of olives. The berries are of great value as a food for poultry, and the birds thrive well on them. Another tree that is also suitable for this district is the carob, which, besides being ornamental, would be valuable in times of need as fodder for stock—a great consideration in these areas. The best method of planting a tree is to dig a hole say 3ft. square, and place in this soil of a better quality than that removed. On no account should the subsoil be replaced on the surface near the tree, as this does not possess the quality of absorbing moisture, but rather has a tendency to cause it to run away from the tree. Trees should be planted just before the rainy season sets in. Care must be taken to see that the tap root is placed downwards: No watering should be done immediately after planting. This causes the very fine roots to sprout and seek the moisture near the surface." Mr. Bristow thought it a pity that more tree-planting had not been done. Pepper trees were best adapted for this locality. Members generally agreed that the pepper was one of the hardiest of trees, and one that was by no means the least ornamental; consequently it was the best tree to grow in a district with a light rainfall.

Wilmington, May 29.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. J. Hannagan (chair), A. R. Gloede, E. J. Gloede, D. George, S. George, Litchfield, Hill, Slee, McGhee, Zimmermann, G. W. and J. Schuppan, B. Jericho (Hon. Sec.), and one visitor.

HARROWING DRY-SOWN CROPS.—The following paper was contributed by Mr. W. Schuppan:—"More attention than is generally the case should be given to land which has been put in in the early part of the seeding. We are often obliged to start seeding operations before the rain comes, while the ground is still dry, and my experience has been that it pays to work back and harrow the dry-sown land after the first rain. It will help the wheat to come away quicker and more uniformly, besides keeping the surface nice and loose. Last year I again harrowed a good portion of my dry-sown land after the first rain, and the average yield was 14 bush. to the acre. Some of the crop not harrowed only returned 7 bush. per acre. All of the land was fallow. I do not say the difference will always be so great, but I have from past experience found that there always is a big difference between the two. There is very little danger of doing harm, even when the wheat is coming up. I have harrowed until the wheat was coming up, and then stopped, as I thought I was doing more harm than good; but I found that after a few days there was very little wheat damaged, and had I kept on I would have had a better crop. Of course, if rain falls immediately after the crop is harrowed the results may not be so

good, as the ground is apt to set; but if a fall is not experienced directly after the harrowing, considerable benefit is derived." In reply to a question the writer said hardly any harm could be done by harrowing sown land after rain. The top crust would thereby be broken and more moisture would be retained. Members agreed with the writer's contention, and fully believed that land harrowed once during sprouting time after a rain yielded better than land harrowed once before seeding. The land could not be pulverised too much.

Wirrabara, June 1.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. P. J. Curnow (chair), P. and H. Lawson, J. Kendrick, A. E. Stott, C. F. H. Borgas, W. Bowman, W. H. and E. J. Stevens, C. Hollett, J. F. Pitman, W. Marner, A. Galt, D. D. Smith, A. R. Woodlands (Hon. Sec.), and two visitors.

FALLOWING.—In a paper on this subject Mr. A. E. Stott stated that as soon as possible after seeding, and while the land was still in good working order, it should be well ploughed to a depth of 4in., and if there should be any weeds growing, this should be followed up in the spring by harrowing with good sharp scarifier harrows. Coulters should be used on the plough, as that implement would then run more lightly, and the mouldboards would turn the ground far better. If the coulters were kept in good repair and slanting forward so as to be in the centre of the share, there was little trouble caused by rubbish accumulating, as the slanting position lifted the rubbish, and it was pulled underneath the next furrow. The writer concluded his paper by suggesting that a ploughing match should be held in the district under the auspices of the Bureau. An animated discussion followed the reading of the paper. There was considerable difference of opinion as to the relative value of the disc and share ploughs. The majority favored the former for sandy soils and the latter for heavy land. It was decided that the Branch should hold a field trial of farm and garden implements.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaleo Valley, May 27.

PRESENT.—Messrs. A. H. Jacobie (chair), Curtin, C. Cox, Bartrum, Burton, Thyer, Woolford, Bartrum, (Hon. Sec) and one visitor.

FALLOWING.—In a paper under this head Mr. P. Curtin said it was advisable in this district to commence fallowing in June or July, directly after seeding. The ground should be ploughed to a depth of from 4in. to 4½in., with a plough cutting about an 8in. furrow, and with a good set of mouldboards that would turn it thoroughly. After a rain the harrows should be put crossways over the ground, and if time permitted it could be harrowed even both ways with advantage. Cultivating should be done early in September, where the weeds were troublesome, so that they might be killed before they got strong roots. Where such weeds as stinkwort and Patterson's curse flourished, it would be found necessary to again cultivate later on. It was preferable to work the ground when it was moist, but rather than allow the weeds to go to seed dry cultivating should be done. Harrowing should follow the cultivator and rains right throughout the summer. This left the ground in good condition for seeding, and assisted in conserving the moisture. Sheep were very useful in assisting to keep down the weeds. The skim plough was the most suitable implement for working the fallow, for it cut the weeds better and left the ground in good condition. In discussing the paper members considered that no hard and fast rule could be laid down as to the depth of ploughing, as different classes of land in the district required different treatment. Members considered that weeds should be kept down at any cost,

Belalie North, May 26.

PRESENT.—Messrs. P. J. O'Leary (chair), W. Davey, J. and H. Waldhutter, A. H. Warner, D. Fox, F. D. Bladon, T. P. Scholtz, W. Cummings (Hon. Sec.).

BOT FLY.—Mr. Bladon detailed his experiences in connection with a horse which he had treated for different complaints, but without success. The horse was destroyed, and on conducting a *post-mortem* examination of the animal it was found that the organs were in a healthy condition, but the bot fly was found in large numbers in the stomach. It was generally believed that this fly was more troublesome in swampy places than elsewhere. The effect on young horses was more noticeable than on older animals.

Mount Bryan East, May 25.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. J. Thomas, jun. (chair), J. Doyle, C. W. Dare, V. Hughes, B. and W. Dunstan, R. Thomas, H. Tralaggan, J. W. Best, T. Quinn (Hon. Sec.), and eight visitors.

FENCING.—In a paper on this subject Mr. Hughes expressed the view that to secure a straight fence it was necessary to first peg out the line. Five feet posts, buried to a depth of 20 in., would be found serviceable. Unless the wire holes in the posts were bored carefully difficulty would be experienced in drawing the wires. The posts should be not less than 5 in. in diameter at the small end, and could be placed 12 ft. apart. Mallee or red gum was the most suitable timber for fencing in this district. In the discussion which followed, opinions were divided regarding the length of strains, and whether it was advisable to thread wires through a post or staple them on.

Whyte-Yarcowie, June 1.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Lock (chair), Faulkner, O'Halloran, McLeod, Mudge, Hunt, Ward, Hunt, Mudge, F. Mitchell, Wittwer, and G. F. Jenkins (Hon. Sec.).

IMPORT DUTY ON SUPER.—The proposal that a duty of 10s. per ton should be imposed on superphosphates imported into the State was discussed at length, and members unanimously resolved to oppose this suggestion.

SHEEPSKINS.—Mr. Ward read a paper on this subject, in which he stated that in the majority of cases insufficient care was given to sheepskins on the farms. He had seen sheepskins thrown over a wire fence and left there to blister in the sun, to the detriment of the selling value of the skins. It was advisable to always dry them in the shade, and for this purpose they should be hung lengthways over a rail. A still better plan was to hang the skin head downwards on the wall, or from a beam in the shed, stretching it well on the top, and placing two or three light sticks across, with a plough share tied on to the bottom to stretch it. Skins dried in this way would return up to a shilling each more than those which were carelessly handled. If skins were to be kept on the farm for any length of time they should be brushed over with weevil wash. This would prevent their destruction by weevil.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Angaston, May 25.

(Average annual rainfall, 21½ in.)

PRESENT.—Messrs. Haggie (chair), Dr. Cowan, J. C. Jacob, Ball, Sibley, Stephens, Player, Smith, Friend, Plush, E. S. Matthews (Hon. Sec.), and three visitors.

PRUNING THE ZANTE CURRANT.—In a paper on this subject Mr. C. E. Stephens said the first object of the pruner was to get as much new wood on the vine as possible. That being so, it was his opinion that the custom of having four permanent arms was a mistake,

as it would be found that there were many weak spots on the vines, and during the pruning growers on such lines would find that they had but very poor stuff from which to choose. With one permanent arm and new rods and terminal rods this was not the case. Although the season had been a trying one, the one main arm seemed to have been well able to feed the new rods and spurs. The fruit also was of better quality and size, and in larger bunches. The vine was under better control for pruning, sulphuring, and picking. No large unsightly sunburnt scars were left, such as was the case when old vines were weakening, necessitating the severe use of the pruning-knife. There should be no hurry to fill up wires, for in that case the result would be that half the vine would not even be strong enough to carry decent wood, without fruit, and drastic pruning would be needed. Another objection to the four-arm system and every wire covered was that on strong soils the top growth was very apt to fall over, and so smother the under fruit, and breed disease, and often render the fruit on the bottom wire hard and shotty. After dealing with the trellising of currants, and advocating that they should run from west to east, Mr. Stephens gave a practical demonstration of pruning with one main arm, short spurs, and long rod, during which he gave the following suggestions:—First year.—Prune the yearling vine back to one bud. Second year.—Prune as before, and train the vine up a stake, having a trellis ready to receive the summer growth. Third year.—Having the vine on the bottom wire, which should be 20in. from the ground, it was a good plan to select a lateral and run it in the opposite direction to the permanent arm. This would protect the vine from strong winds, and do away with the necessity of tying it to a stake and prevent it from turning over and breaking. All buds below this lateral should be suppressed. Fourth year.—First of all it was necessary to suppress the lateral, and see that there was a nice sweep at the turn—not a sharp bend, as this was apt to cause water shoots and suckers on the trunk. The first bud should be quite 8in. to 10in. from the bend. This was most important, for if a spur were left on or very near the turn it would gather so much sap that it would rob the young vine, and in all probability be knocked or blown off before it reached maturity, and leave a nasty blank space. From this on the spurs (one bud), should be at intervals of from 8in. to 10in., and the terminal rod selected from the base of last year's rod; not from the end. This ensured good, strong, healthy wood right from the first spur, which was most important. Weak spaces of from 3ft. to 4ft., and even more, in the middle of the vines were often caused by the pruner being in too much of a hurry to fill up his wires. Fifth year.—The pruner had now to begin using his judgment. He should know at a glance if the trees were equal to one or more rods. These rods should be carried up to the top wire, which should not be more than 16in. from the bottom wire, and every year as the vines got stronger the rods might be increased. Never go beyond three rods of 10 buds and a terminal rod of 10 buds. These and the spurs which were to grow wood for next year's pruning would be plenty for the vines to carry. The beauty of this system was that if it were rather overdone one year the number of rods could be reduced the following year. These rods only served for one year, and were cut completely out every pruning, and others were taken up from a strong spur.

Balaklava, June 8.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. R. S. Goldney (chair), E. Fisher, H. L. Tyartz, H. P. Burden, F. Wagner, G. C. Neville, P. Anderson, H. Roberts, H. M. Tuck, P. H. Roediger, B. R. Banyer (Hon. Sec.), and one visitor.

NOXIOUS WEEDS.—Mr. Tyartz read a paper as follows:—"The matter of noxious weeds is such an important one that it is to be regretted that it is at all necessary to write on the subject. The noxious weeds which have now a home, or are making their home, in this district are star thistles, Canadian star thistles, artichokes, wild onion, wild turnip, Salvation Jane, and stinkwort. The star thistle, Canadian star, and artichokes are at present chiefly to be found on the roads. The worst is the star thistle, and the manner in which it is spreading is alarming. On nearly every road in the district star thistles are to be seen, and something should be done to destroy them, as nothing will decrease the value of land quicker than this weed. A practice which I have frequently noticed in weed destruction is to cut them when they are dry, or only to cut the tops off them with a scythe. Nothing is worse than to cut thistles when they are dry, as by this means you will get them all over the land, and if you only cut the tops off them you will have them shooting out again. To successfully cut them it is necessary to go over the ground at least twice a year. It is useless trying to destroy them when you leave enough for seed every year. If you do not allow a single seed to fall out it will take five or six years

to destroy them, as the seeds do not germinate every year. Therefore I would suggest cutting the plants twice a year. Grub them out, and continue this practice for five or six years. Wild onions are growing just outside of the town. The plant known as Salvation Jane is making its appearance on the roads about here. It has proved itself a very noxious weed in several districts not very far from us. A plant known as wild turnip has been on my farm ever since I have been here. I have been destroying it every year, and it is making no headway. It is a plant similar to a turnip, and grows very strongly in a wet year. I have had some plants of this which I could scarcely pull out, so strong was the taproot. Nothing will eat it, and it is a great hindrance to stripping. Stinkwort, perhaps some will say, is not a noxious weed; but how very often do we see a fallow paddock covered with stinkwort, taking out of the land the moisture which should be stored up for the next year's crop. It might be news for some to know that stinkwort was declared a noxious weed in Victoria many years ago, and is still so at the present day. In some places it is said that landowners would rather sacrifice their holdings than have to pay the cost of eradicating the weed. What will be the consequence if, a few years hence, the Noxious Weeds Act is as strictly enforced in South Australia? Will it not have the same effect? I have seen land which was covered as thick with star thistles as any paddock ever was with stinkwort, and no stock would go into it. No landowner should wait till he is compelled by the law to destroy noxious weeds, as it is to his own interest to destroy them. It is very annoying to do your best to keep down noxious weeds when your neighbor does not trouble to do so. Most of the weeds are introduced by sheep from the large estates, and the rapidity with which most of them spread is surprising. About five years ago I saw two or three star thistles at a certain spot on the road. I came to the place two years later, and was surprised to see the increase, but last November I passed the same place and the whole road was full of them, and the owner will have considerable trouble to destroy them. United action should be taken to destroy all noxious weeds." Mr. Fisher had been rather fortunate in not having been troubled with noxious weeds. He regarded stinkwort as a noxious weed, but he remembered some years ago when stinkwort first appeared in the State that a professor of agriculture went so far as to say that, as the roots of the plant went down into the subsoil and loosened it, better crops would be grown. There had been great neglect on the part of landowners, resulting in the spread of the plant over the State. Star thistles required to be cut right out of the ground to be got rid of. It was no use just cutting them, as had been done in places on Gulf Road. Mr. Tuck stated that on the plain land along Gulf Road weeds seemed to grow prolifically. It was a mistake to allow the plants to get in the seeding stage before cutting them. It was a good plan to go over the ground twice. District councils would do more good if they destroyed the weeds in the earlier stages of their growth. There was much to be done in regard to weeds in this State, and the Government and district councils should see that the destruction was taken in hand. In some places land was overrun with weeds. Mr. Roediger thought that if they had a noxious weed that was worse than others it was stinkwort. There was great need to deal with star and other kinds of thistles. The district roads seemed to be the worst for noxious weeds at present. Farmers cut them down in the paddocks, but the weeds flourished on the roads to spread the seed. Mr. Anderson said if the noxious weeds were to be eradicated, it was only by everyone doing his share of the work that it would be accomplished. The seeds with down on them were carried for miles by the wind and on the backs of sheep. On his farm there was a waterway, and seeds of all kinds were brought down; and amongst others he had noticed wild onions and soursops. It was almost impossible to destroy the soursops, but he had the onions in check. Mr. Neville indorsed what had been said about star thistles and other weeds being noxious, but it was a question whether they should include artichokes as noxious weeds. Those who had cows found the artichokes were a valuable fodder, and the cows were very fond of them. Horses, too, were fond of them, and would paw the ground to get at the roots. Dry bible was unknown among cows that fed on artichokes during the dry weather. Stinkwort could be destroyed by running scarifier harrows over the ground just as the plants came up. They had to be very careful when the weed began to seed. There was then a little gummy fluff on the plant which would kill sheep by the dozen. Some years ago he lost a number of valuable sheep which had been put in a paddock where there was stinkwort in the stage he had mentioned. He opened some of the sheep and found the rough part of the stomach full of the little burr of the stinkwort seed. It was only for about a week during a certain stage of its growth that sheep could be safely put on stinkwort land. Wild turnip was the worst weed he knew of. At Snowtown at one time one farmer had six or eight men pulling up this weed. Mr. Burden thought the Noxious Weeds Act required to be amended. Nearly all the plantations in Balaklava had the Bathurst bur in them, and the wild onion was growing up towards the cemetery.

He agreed with Mr. Neville as to the fodder value of artichokes. Mr. Wagner thought landowners should take more care in clearing their lands of weeds. Whenever he noticed any of the weeds about his place he had cut them up thoroughly, and was not troubled with that patch again. He was not troubled with the weeds on the roads adjoining his property, but farther along the road was smothered with them. There were some star thistles near his farm, and he carted a load of straw and burned them off. Weeds needed to be cut down to the roots. It was useless to cut them level with the ground. He did not consider artichokes a noxious weed, but where these would grow anything else would grow. Mr. Roberts was not troubled with noxious weeds, because he lived back from the tracks taken by travelling sheep. Stinkwort might be regarded as a blessing in disguise, because it could be got rid of by cultivation. The Chairman was not troubled with noxious weeds. The land in his neighborhood was not strong enough to grow them, and cultivation on their light land easily got rid of any that appeared there. Charlock was the worst weed they had to contend with. He believed wild turnip was a very bad weed. The artichokes grew along the banks of the river, and the cattle did well on them during the dry weather.

Blyth, May 28.

PRESENT.—Messrs. W. Pratt (chair), Zweek, Buzacott, Lehmann, Shepherd, R. M. and M. S. Longmire, A. A. and J. C. Schulze, J. Pratt, Ninnes, Pedler, J. S. McEwin, Best, Clarke, H. W. and W. O. Eime (Hon. Sec.), and three visitors.

AGRICULTURE IN ENGLAND.—Mr. J. J. Clarke delivered an interesting address on his recent trip to England, in the course of which he expressed the opinion that the South Australian farmer had very little to learn from the farmer in the Old Country as a general rule. In his travels through England he had not seen more than 200 acres of wheat. It was not the practice there to cut wheat for hay; but grass was cut for this purpose. About a month after the grass had been cut the stubble shot out quite green again, and provided excellent feed for stock. Of the different breeds of sheep which had come under his notice he preferred the Hampshire Downs, which was a fine class of sheep, and one that he thought would do well in this country.

Blyth, June 25.

PRESENT.—Messrs. M. Coleman (chair), C. H. Zweek, J. S. McEwin, Clarke, Ninnes, W. and J. Pratt, J. C. and A. A. Schulze, W. O. Eime (Hon. Sec.).

DRILLING SEED.—In a discussion on this subject members agreed that wheat that had been shallow drilled was, this year, ahead of the deep-drilled wheat. Mr. Ninnes drew attention to the fact that on some hard red patches the drill would not go in, and he had never known wheat to come up better than on these. Mr. McEwin had a piece of fallow which he had cultivated last winter before seeding, after seeding, and again in the spring. This had come up quicker and better than fallow that had been ploughed. Some farmers when putting in the seed never cultivated fallow ground before the drill. If there were any rubbish they used scarifier harrows, and always obtained a good crop. Mr. Coleman did not believe in cultivating before the drill if there were no rubbish. He had seen a farmer cultivate very deep before the drill, and his wheat at the present time was hardly through the ground, while those crops which had only been harrowed before the drill were much more advanced. He thought it wise to harrow after the first rain following the drilling. If used at the proper time, a set of harrows was one of the most useful implements on the farm.

Clare, May 4.

PRESENT.—Messrs. D. McKenzie (chair), C. T. Jarman, A. Hill, F. S. Walker, A. Pycroft, E. Victorsen, S. Chambers, D. Forbes, J. Berridge, C. Scott, C. J. Radford, T. W. H. Lee, M. L. Nolan, J. Dux, D. Menzie, P. R. Pascoe, J. Scales, T. W. Maynard, J. Evans, P. H. Knappstein (Hon. Sec.), and one visitor.

QUESTION BOX.—In reply to a question as to whether it was advisable to use bluestone by itself as a winter spray, and, if not, what strength of Bordeaux mixture it would be advisable to use now as a spray, Mr. T. H. W. Lee said good results were to be had by using bluestone alone at the strength of 1lb. of bluestone to from 15galls. to 20galls. of water. This should be used to spray the trees at the present time. Members thought

the best times to spray young peaches suffering with curl leaf were the present and in the spring, Bordeaux mixture being used.

IRRIGATION.—The following paper was read by Mr. C. Scott:—"Irrigation in this district, if well carried out, will certainly pay. First of all we will take the currants, not on a large scale, but on an area of from one to six acres—enough for one man to look after and irrigate as it should be done. As for the water supply, that is easily obtained by well-sinking, and on most places a good supply can be got fairly near the surface. I have a well on my place about 50ft. deep, and have 8ft. to 9ft. of water in it. This would give me enough to flood my vineyard several times a year. If I had had the appliances to flood my vines twice during the hot spell that occurred during the past season it would have made a wonderful difference to my crop. What would be the most useful plant and do the best work in a garden? I would not recommend the windmill, because one cannot always depend on the wind keeping the storage tanks full. I was told that those who were depending on mills last year had to draw water for their stock and horses. I would therefore recommend a small portable petrol engine to drive a pump to force the water direct to the vines. If the vineyard is on a rise, a storage tank will have to be used. The whole plant—engine and pump—could be purchased for about £60. The engine could also be used to drive a chaffcutter. If we were to irrigate, would our currants be any better? I think they would, because I have a vine under a tap, and it always has a far heavier crop, and the fruit is as good a flavor as the others, and the berry is larger. Therefore irrigation is profitable. Would irrigation bring about more diseases than we already have? I do not think it would. As it is we have oidium in the currants. This, they say, is caused by the presence of too much moisture in the ground. Last year we had a lot of oidium, which we put down to the extreme wet; but the crop was a far heavier one, and the loss incurred through oidium was not nearly as great as the loss incurred this year through dry weather; therefore if you irrigate you will come out on the right side, even if irrigation does favor oidium, which can be almost completely overcome by freely using sulphur at the right time." Mr. Jarman thought that irrigation was not necessary for fruit trees and vines in this district, but dairymen should practice it largely with lucerne-growing. Mr. Scales said that if a gardener had an irrigation plant he could use it at his discretion, and need not irrigate his garden in years when this was not needed. Mr. Victorsen said there was not sufficient water to be obtained in this district for irrigation, and that the writer had underestimated the cost of an irrigation plant. Irrigated fruit was always larger, but it was deficient in sugar. Mr. Dux said that most people who went in for irrigation commenced on too large a scale, and so got poor results. He did not think it profitable to irrigate fruit trees and vines.

Gawler River, May 31.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. A. J. Bray (chair), Davis, A. M., W. J., J. H., and C. A. Dawkins, Dunn, B. Hillier, Leak, Hayman, Higgins, and F. Bray (Hon. Sec.).

IRRIGATION.—Mr. A. J. Bray delivered an interesting address, in which he stated that in some countries where the rainfall was deficient the populace depended entirely on irrigation for the raising of crops. To successfully carry out an irrigation scheme the quality of the water was first to be considered. For the irrigation of fruit trees the practice of flooding was preferable to that of running the water through channels. Sprinklers, as a general rule, were not to be recommended. As to whether water at 6d. per 1,000galls. could be profitably used for irrigation, the view was expressed that as a means of saving a crop from total failure, this might be utilised. The growing of lucerne with water at that price on a large scale would not pay; but if a person had no other means of securing green feed for his stock, a small crop could be advantageously irrigated. Mr. A. M. Dawkins said one of the dangers of irrigation was that of bringing salt to the surface. A good supply of humus was essential where irrigation was carried on to any extent. If this were absent the soil would become washed out, and would bake very easily. Reference was made to the possibility of irrigation on the lands adjoining the River Murray.

Greenock, June 1.

PRESENT.—Messrs. A. G. Heinze (chair), G. O. Tümmel, R. Tümmel, J. Jungfer, J. C. Jaensch, C. Liersch, A. Nitschke, B. Nitschke, H. Kock, F. S. Pfaffner, G. F. B. Gniel,

L. A. Traeger, E. Bockmann, O. Semmler, R. E. Radford, P. Gehling, E. Geyer, O. Krüger, J. G. Arnold, W. Roenfeldt, W. B. Siebo, and J. Koschade (Hon. Sec.).

GERMINATION OF WHEAT AND MAIZE.—The Hon. Secretary gave an interesting address on this subject, illustrating his remarks by bisecting a grain of wheat, and explaining the function of various parts of the grain in regard to the germination. The historical origin of the maize plant was discussed, and its value as a food for cattle, pigs, and poultry was pointed out.

Mallala, June 7.

(Average annual rainfall, 16½ in.)

JUDGING DRAUGHT HORSES AT AGRICULTURAL SHOWS.—Mr. James Nairn, in a paper on this subject, stated that in his opinion considerable good would follow the introduction of a system of judging draught horses at agricultural shows which would enable the public and the owners to see exactly where the faults lie in their horses. To the ordinary individual attending the show very little information was forthcoming in regard to the various defects or strong points of the animals submitted for competition. He suggested that a description of the perfect type of horse, with measurements and proportions, should be used by judges as a standard. The horse could be judged from this, and allotted points for various characteristics. These points could be marked on a card, and this could be attached to the horse during the show, and be open to inspection by the public. By this means the public would become educated in regard to the best type of horse to breed.

Salisbury, June 4.

PRESENT.—Messrs. E. Moss, R. King, McNicol, A. J. Harvey, Tate, Frost, Bussenschutt, McGlashan, Shepherdson, Illman, Cocker, T. and H. E. Judd, Patterson, Hooper, Urlwin, and Baylis.

GENERAL MANAGEMENT OF THE FARM.—Mr. Patterson read a paper on this subject, as follows:—"To successfully manage a farm from small beginnings and little cash at starting is not so easy as a number of people, who have not had to go through that experience, may imagine. As they travel through the country, they see in places fine farm homesteads, with good fences, up-to-date implements, good stock, &c., and think what a fine time the farmer has; but they very often lose sight of the fact that it has perhaps taken years and years of hard work, thrift, practical experience of how best to cultivate to get the best results, the best implements to use for different purposes, careful breeding and culling of stock of all kinds, to bring the farm to its present condition. To farm with success, when you have to depend on your own efforts, it is well to go slowly for a few years; and my experience has taught me never to attempt to do more than can be done well. A small farm well tilled is better than a big acreage badly tilled; and a small number of good stock well cared for better than a lot of poor ones, especially in so far as milking cows, sheep, pigs, fowls, &c., are concerned, as these side lines pay well; and if breeding you will always find, if you are a good judge of what you require, your best investment is to buy the best sire your pocket will allow. A few pounds or shillings extra, as the case may be, is money well spent. Never buy an animal for a sire just because it is cheap. Then we must take into account the fact that seasons vary and prices fluctuate; but I have noticed that there is always some particular line selling well; so do not put all your eggs in one basket. Each must decide, according to the size and locality of the farms and the nearness of market, which class of stock will best suit requirements and give the best results over a number of years. For instance, pigs were selling at a good price for a few years. Some few months ago small pigs were hardly worth carting about; now they are returning a payable price again. From present appearance it is likely to be a bad lambing season, but that is no reason why one should give up breeding fat lambs, because of one year's failure. Even with the best management one will have failures, as the rainfall, after all, has the most to do with the success. I will now give an outline of my experience of farm management; and, to give members present a chance to criticise it, will apply it to the farms around Salisbury, although I have not been here long enough to know what the district is like in a favorable season. The first thing is a good water supply. In this district good stock water is obtainable almost anywhere at shallow depths by sinking, so this is not a very serious question. However, in some districts it is a serious matter, and a great drawback. Then we come to the main business of the farmer—growing hay or grain, as the case may be. Owing to its being close to the Adelaide market, hay is the main crop in the locality. On many farms the whole crop is cut for hay, and when it is at a good price this is by far the most profitable course

to adopt. This is the case in almost any season, if the farmer has the teams with which to cart his own, and has a small holding, and can do the bulk of the work without having to spend too much in employing labor, &c. But seasons vary and prices fluctuate, and I question very much if it would always pay one like myself, who has to employ all labor required in the harvest time, except that which I can do myself, or anyone cropping, say, from 150 acres upwards, to cut the whole area for hay, as one can grow wheat, oats, or barley. Because a farmer reaps some of his crop, that is no reason why he need sell it at the market price for wheat to the flourmill. There is a growing demand for good seed wheat, &c., and for good clean seed, true to name, a reliable grower can always get from 1s. to 3s. or 4s. for some varieties above market rates. A few of the reasons why this is so are: first, it takes a good deal of extra time and trouble, in picking, to keep the different varieties separate, both in seeding and harvest time; and then the majority of farmers get a change of seed from somewhere every year, or experiment with some new variety. I prefer sowing several varieties, and can recommend Improved Dart's Imperial, Newman's Early, Le Huguenot, Baroota, Majestic, Gallants, or White Tuscan, and King's Early; but the last two are susceptible to red rust. They are all good hay wheats, and there is a good demand for them as seed wheat. It is here that a farmer's experience and good management pay, i.e., to meet the requirements of chaff merchants and seed wheat buyers. On a farm suitably subdivided, worked on a three years' rotation, in a district like this, a farmer should be able to breed a few foals and keep cows and sheep also. We will take the horse first. If possible, breed some every year, as there is generally abundance of natural grass and hay available. The trouble very often is to get a suitable sire. My experience has been that very often what we consider the best horse travelling has far too many mares. The only success I have had so far is by patronising local stallion owners. In nearly every farming district we now find leading farmers, who have a number of good brood mares of their own, who keep a stallion, and this gives the small owner a chance. These owners will not take too many mares, and in most cases will insure. The usual course is for £1 to be paid at service, and if there is no foal, no more has to be paid. I place the brood mare first as a revenue-producing animal on the farm. Next comes the cow, and every farmer should keep from two upwards; but it is usually unwise to keep a number of cows and keep sheep as well on a small farm. If you have good milkers and the available space and labor to look after them well, and grow some green fodder or make ensilage, they should give a larger return than sheep, but far more labor is required. Every farmer should make his fences sheep-proof, even if he only fattens a few sheep for his own use and to help keep the fallow clean. Lamb-breeding pays well. Either the pure Merino, which will do for wool or 'as fat lambs under favorable conditions, or the crossbred, are profitable. Buy a line of six-tooth Merino ewes and mate them with one of the English breed of rams. I prefer the Shrop., but it is only a matter of opinion. Whatever sort you prefer, get a good one of its kind. Many prefer the crossbred ewe, but you cannot always get a line of these ewes. They are quickly bought up, as they are good mothers and very prolific breeders. Pigs are also a good side line. If you intend breeding, make a few good sties, and if a naturally dry and well-drained position is not available it is advisable to pave them, as pigs will not thrive in slush. Fence in a small plot around the sties, so that in fine weather and summer time the pigs can have the run of it. Sow an acre or two with barley, and begin cutting it when about a foot high. With a little grain or peas this will keep your breeding sows in good condition. Give them some crushed grain or pollard while they are rearing their young. There are several good breeds to choose from. I have bred from the pure Berkshire, and also crossed this breed with the British Black, which is a very quick grower. They realise good prices as slips, as they are a good size at three months old. As most farmers here sell their milk, they would have to grow peas, barley, or wheat, or buy same at a reasonable cost if they went in for baconers, or their profit would be very small. I have not had experience with ducks, geese, or turkeys, but fowls pay well if properly managed and a good laying strain is kept. White Leghorns, Black Orpingtons, and also Silver Wyandottes are good farmers' fowls. To keep fowls of all the colors of the rainbow, fed on screenings, roosting on machinery of all sorts, or trees, and wood heaps, is to court disaster. To make poultry pay you must breed fowls that will lay when eggs are selling at a good price, or all the year round, and to do this you must buy eggs, or a cockerel and hens, from a reliable breeder of the particular breed you fancy. Personally I can recommend White Leghorns and Black Orpingtons. They are both splendid layers, and the Black Orpington cockerels are fine heavy birds and will bring from 2s. 6d. upwards in the market. When breeding, put up two small pens, one for the White Leghorns and the other for Black Orpingtons. Pick out your best layers from each breed—from three to six is ample—and mate these. Blacks in May or June, and the Whites in June or July, and breed right on until November. A wire-netting yard and iron shed with

roosts for the hens outside will also be required. Always pen up young cockerels and fatten them for market as soon as they are from two to three months old. If you want information on feeding, &c., you cannot do better than look up the poultry notes in newspapers. My paper would hardly be complete without a word about farm buildings, &c. We must have rain-proof sheds for our machinery, and a good stable, barn, &c."

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Pine Forest, May 28.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. D. Carman (chair), C. Schultz, A. Hewett, W. Smelt, S. Barr, A. Nelson, R. D. Goodridge (Hon. Sec.), and one visitor.

IMPORT DUTY ON SUPER.—It was resolved that the Branch strongly object to a duty being placed on imported super., and that it join with other Branches in protesting against the proposal.

PICKLING WHEAT.—In a discussion on this subject Mr. Carman stated that in many cases pickling hampered the germination of the seed, but if wheat were badly affected with bunt it was always wise to pickle it. He had once secured a clean crop from smutty seed by using 1lb. of bluestone to every bag. He preferred to pickle on a good floor. Members generally favored dipping.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. C. Schultz. Members inspected a useful crushpen made as follows:—A yard 12ft. by 10ft. was enclosed with a fence consisting of posts 5ft. high and 5in. in diameter; 4in. by 3in. rails were used. A gate of the same material was fastened with strong hinges on one side, about 2ft. from the end, and made to open inwards. The colt was run into the yard, and, as the gate was opened, was forced against the rails. The gate was fastened to a strong post, and in this manner a crushpen was formed. Two two-year-old colts were much admired by members.

CARE OF MACHINERY.—The Hon. Secretary read the following paper on this subject:—"I do not like to see outbuildings too close together, as in case of fire there is more danger of extensive damage. It has been proved that iron roofs are far the best for buildings, because of the safety from fire and the catchment they provide for water. No matter how well a straw roof has been put on, it will, in time, leak, and the stable in wet seasons will be damp. If stone is plentiful, nothing is better than stone walls. There are many good substantial barns and stables built by amateurs to be seen in this district. Unfortunately, stone is very scarce in some parts, so that either timber or iron must be used. There are also some splendid hay sheds, and some farmers have stable, hay shed, and engine and chaff shed under one roof, which is very handy, but rather congested in the event of a fire. Iron roofing is the cheapest in the long run, as when once erected it lasts for years. I have tried cold water paint for iron walls, and have found it good, as it does not rub off or wash off with the rain. Many people are rather neglectful with their implements. They see that their harness is kept oiled, but paint on their machinery is often forgotten. It is a good plan to have all machinery well cleaned immediately after use, and then any worn parts can be repaired. Paint harvesting machinery one year, and wagons, drays, and drills the next. Ploughs, harrows, &c., would also benefit by a coat of paint occasionally. I would paint the hay frame with either black elastic paint or boiling tar. Either is more durable and waterproof than paint."

WESTERN DISTRICT.

Colton, June 15.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. H. Whitehead (chair), W. H. Barns, F. Shipard, G. Lewis, P. P. Kenny, R. Hull, M. D. Kenny, L. Larwood, and W. J. McBeath (Hon. Sec.).

SHARE FARMING.—Mr. M. D. Kenny contributed a paper on this subject. To start a new farm on shares, he said, one required to lay out £1,000 as follows:—Three tons galvanized iron, £60; timber, and erection of same, £25; two 50,000-gall. tanks, £100; eight horses at £30 each, £240; one eight-furrow plough, £40; one 18-disc drill, £50; one harvester, £90; wagon, £60, tip dray, £20; wire and wire netting, £100; harness for horses, £25; clearing 300 acres, £170; miscellaneous, £20. The person to take charge should be a good horsedriver and handy with machinery. The usual conditions under which share farming was undertaken were that the landlord found the above materials, all of which were to be in good order and up to date. The other party kept all machinery in repair and delivered the landlord's wheat to the nearest port or railway station. After instancing cases of share farming which had come under the writer's notice, the paper continued—"The success of share farming depends to a large extent on how the landlord and share man get on. The share man should be helped as much as possible, as the better it pays him the better it pays the landlord. Some land is far more easily worked and cleared than other. Different conditions require different methods."

Coorabie, June 7.

PRESENT.—Messrs. C. T. Giles (chair), Hobbs, Roberts, Kingsley, Gregory, and one visitor.

RABBIT DESTRUCTION.—A lengthy discussion took place as to the best method of destroying rabbits. Mr. Kingsley, who had tried various means, was of the opinion that the most effective destructive agent was the poison cart. Some members favored the use of sandalwood twigs and strychnine paste.

Elbow Hill, May 25.

PRESENT.—Messrs. Cooper (chair), G. Dunn, A. Chilman, F. Freeth, C. Jacobs, E. Storey, L. Wheeler, S. and E. Wake, H. Wheeler, and G. Wake (Hon. Sec.).

DESTROYING RABBITS.—The Chairman contributed a paper on this subject, in which he expressed the view that 1,000 rabbits would eat as much grass as would keep nearly 200 sheep, and it therefore behoved the farmer to keep his paddocks free from this pest. The most satisfactory method of destruction was by means of the poison cart, which should be used from the 20th February each year until the rabbits were completely cleared out. It was useless for one farmer to endeavor to clear out the vermin; united action was absolutely necessary, and this should be made compulsory. Farmers should enclose their holdings with 4ft. wire netting of 1½ in. mesh, which would effectively keep out the rabbits if the bottom of the wire were buried to a depth of at least 9 in. He was of the opinion that all three-chain roads in the district should be reduced to one chain, and the other two chains leased or sold to the adjoining landholders, as the roads at present were breeding grounds for rabbits. In discussing the subject Mr. Chilman said the poison cart was a very effective means of dealing with rabbits, but there was a danger of sheep picking up the baits. Sandalwood sticks and strychnine were most satisfactory. Mr. Dunn did not think it necessary to erect 4ft. netting fences. It would be found that the purpose would be served by using 3ft. netting if the fences were properly constructed. The Hon. Secretary drew attention to the necessity of erecting suitable gates and giving due attention to the netting fences when erected.

IMPORT DUTY ON SUPER.—The Branch entered an emphatic protest against the proposal to impose an import duty on superphosphate.

Koppio, May 30.

(Average annual rainfall, 17 in.)

PRESENT.—Messrs. F. Richardson (chair), R. F. Richardson, H. Thompson, G. and M. Howard, G. B., M. T., and T. Gardner (Hon. Sec.) and one visitor.

IMPORT DUTY ON SUPER.—The proposal to impose a duty on imported superphosphate was discussed by members, who expressed an opinion strongly against the suggestion.

FATTENING SHEEP ON CHAFFED HAY.—The Hon. Secretary reported that he had made attempts to fatten sheep on chaffed hay. The sheep fretted a good deal, and did not eat sufficiently well to fatten. The average amount of food consumed per sheep

for 51 days was 1½lbs. per day. No improvement in their condition was noticeable at the end of the test.

FARM BY-PRODUCTS.—Mr. T. Gardner read the following paper:—"Farmers in this district could pay more attention to by-products on their farms with considerable advantage to themselves in many cases. Many parts are well suited for raising and fattening pigs, which all farmers should keep. Pigs are very profitable, as they have big litters which grow very quickly if well kept and fed. Peas are splendid for fattening pigs, and they grow well in this district. They should be sown fairly early, and it pays to prepare the land well for them. Harrow well after sowing, so that they can be raked without raising dirt and clods. Vegetables could be grown on the flats and along the banks of creeks. Heavy crops of onions and potatoes can be grown in suitable places in the district. Farmers should have a paddock of well-worked fallow on which to sow rape or other early green feed. This would soon be ready to fatten a few sheep for the winter, when mutton is always scarce and dear. It is a very good plan to put a fair dressing of super. on the grazing land, as this brings up a better body of feed and there is more nutriment in it if the land is manured. If farmers paid more attention to such points as having a few small paddocks near the homestead, cultivating a few acres of lucerne, and keeping three or four good cows and a good number of poultry, the returns from the farm would be considerably enhanced." [We should have liked to have read the views of other members on some of the side lines touched upon in this paper.—ED.]

Miltalie, May 25.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. J. P. Story (chair), J. W. and E. Story, F. F. Alm, A. R. S. Ramsey, F. Jacobs, T. A. and M. H. Wilson, W. G. Smith, P. G. Wilson, W. E. Hier (Hon. Sec.), and four visitors.

FENCES, STOCK, AND IMPLEMENTS.—A discussion took place on the paper read by Mr. A. R. S. Ramsey at the last meeting, and published on page 1188 of the June issue. Mr. Wilson did not think it wise to use only wooden posts in fencing. He would also use iron; with which opinion the majority of members agreed. Mr. F. Jacobs thought fences should not be lower than 3ft. 10in., and that they should be tied with No. 12 galvanized wire. No useful purpose would be served by placing a wire half-way down the netting, but if such a wire were put in it was essential that it should be galvanized, as a black iron wire would cause the netting to rust in about three years. The posts could be put more than 9ft. apart without materially affecting the stability of the fence. Mr. Hier said that time spent in putting up good sheds was time well expended. Horses could be kept fat while at hard work if they were well cared for. They should be given plenty of time for their morning feed, and while less time was necessary for the midday meal, the quality of the feed should always be first class. Mr. Wilson thought No. 8 wire was most suitable for tying barbed wire to the posts, and he would tie the netting in more places than was usually done. Mr. Alm thought the posts would be quite close enough if put in at intervals of 12ft. The Chairman thought 3ft. 6in. was quite high enough for fences. Foals should be turned into a good grass paddock; this would give them a start in life. Mr. Smith would put posts in the ground at least 16in. if the fence was anything above 3ft. in height. He was of the opinion that in future concrete posts would be generally used for fencing. In reply, Mr. Ramsey said the fence he advocated was not too high; if it were any lower the animals would jump over. He admitted that iron posts were useful, but thought that good white mallee would last as long as could be desired. He had no difficulty in keeping horses fat when working hard, but he had found it very necessary to keep the stables clean to prevent outbreaks of disease.

FARMERS' EXPERIMENTS.—Mr. P. G. Wilson, in a paper on this subject, expressed the view that as a general rule the farming community omitted to carry out as many experiments as could be reasonably expected of it. The agricultural districts in the State covered a vast area, and therefore the classes of soil and the rainfalls were diversified, and different classes of cultivation were necessary. The most important line of experiments was that connected with the working of the soil. Very often men living in the same district and owning similar land advocate entirely different methods of cultivation, and it was only by experimenting that it could be decided which was right. To ascertain whether deep or shallow ploughing returned the better results it was only necessary to take a small paddock and plough one-half of it to a depth of, say, 5in., and the other half 2in. The seed bed should be well prepared, and the same quantity of manure and seed should be applied to each plot. Separate harvesting would reveal which was the

better method. Experiments should also be made with the view of obtaining information as to the best way of conserving moisture. It was recognised that there was insufficient rainfall in one season to enable a good crop to be reaped off a large proportion of the agricultural lands in the State. It was therefore advisable for the farmer to practise the system of fallowing which would conserve the largest amount of moisture in the soil. The farmer should give early attention to his fallow. Rubbish should be burnt off, and the land should be skimmed over with a light implement in March. This would bury the weeds and assist in retaining the early rains in the soil. When the time came to plough, in June or July, it would be found that land treated in this way would work up much more finely. There should be no need to stop the fallowing on account of the ground turning up too cloddy. The cleaning of the land of weeds was another point worthy of consideration, and in different districts different implements would be found most suitable for doing this. Only by experiment could the farmer decide which was the best for him to use.

Penong, June 8.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Saunders (chair), Stiggants, A. Brook, J. Oats (Hon. Sec.), and one visitor.

HARROWING BEFORE OR AFTER DRILLING.—In reply to a question as to whether it was better to harrow before or after drilling, Mr. Stiggants instanced cases in which crops had been benefited by being harrowed after they were up 3 in. or 4 in. He thought the Bagster country would grow better crops if they were harrowed after being drilled, as moisture would be conserved in the soil. The Chairman thought that to drill without harrowing was a waste of seed, as a considerable portion would not be covered, and the birds and rabbits would take this. The Hon. Secretary said his land was of a loose nature, and if drilled before rain would run together after the drill, and the seed would be covered without the necessity of harrowing. If it were drilled when the ground was wet, however, it was necessary to harrow after the drill; but in the event of the ground being very wet he would not put the seed in.

PLOUGHING NEW LAND.—In discussing the best depth to which to plough new land, the Hon. Secretary gave his opinion that it was better to plough shallow the first year. He generally ploughed only just deep enough to turn the soil over, and seldom to a depth of more than 4 in. for fallowing on the range; though, perhaps for the boxbush country deeper ploughing would be necessary. The Chairman said there were some parts that could not be ploughed deep with advantage, as the rubble would be turned up, which would be detrimental. One of his neighbors in the early days of the district ploughed deep, and the field did not for several years return a crop that paid for the trouble of reaping; that was on plain land. Mr. Stiggants had found that at Bagster ploughing 3 in. deep the first year gave a greater yield of straw and also grain. For fallowing he advocated ploughing to a depth of 4 in.

Shannon, April 27.

PRESENT.—Messrs. W. Proctor (chair), Cronin, J. and M. Wilkin, Fleming, Carey, Williams, H. Proctor, F. Proctor, Gordon, W. and H. Glover, J. J. Cronin (Hon. Sec.).

THE AGRICULTURAL BUREAU.—The Hon. Secretary contributed the following paper:—“There are numbers of people nominated as members of a Branch of the Agricultural Bureau who do not seem to know what that institution really is; or who, knowing what the Bureau is, do not realise the vast benefit that it is to the State whose chief industry is agriculture. Without a special department managed by enthusiastic experts of wheat-breeding, wheat-growing in South Australia would soon be a thing of the past. Everyone must admit that science is becoming more interwoven into farming, especially wheat-growing, every year. It is the duty of every member of every Branch to take an interest in the Bureau, and keep the Branches going by their attendance. It is the custom locally to adjourn the meetings during the busy times of the year. This is quite right, as in the harvest time some members work until fairly late; but I do not think anyone would be seriously inconvenienced to attend during the rest of the year.”

Yabmana, May 25.

PRESENT.—Messrs. J. N. McCallum (chair), J. F., J. G., and H. Robertson, G. W. Story, W. F. Schuman, F. H. Binke, A. Binke, J. G. Pengilly, W. W. Lindsay, L. S. Strothers, C. E. Frost, M. K. Frost (Hon. Sec.), and six visitors.

VEGETABLES.—Mr. L. S. Strothers dealt with this subject in a paper, in which he stated that a very good crop of useful vegetables, such as cabbages, cauliflowers, lettuce, turnips, peas, and beans could be grown with the expenditure of a little time and patience. Cabbages, cauliflowers, and lettuce should be grown in rich soil, and should be given a good dressing of stable manure well turned under. Every care should be taken with the young plants, as they were easily broken. Planting should be done just prior to or after a fall of rain. A somewhat sandy soil was required for turnips and peas. These crops could be well sown with a drill. The practice was to set the drill to sow 150lbs. to 200lbs. of super. to the acre and thoroughly mix 1lb. to 2lbs. of turnip seed with the super., 2lbs. of seed being sufficient for one acre. When sowing turnips in a small garden one packet should sow half a square chain. If sown broadcast it was necessary to mix the seed with damp ashes. Where peas were sown with a drill it should be set to sow eight pecks of peas and 80lbs. to 100lbs. of super. to the acre; 2lin. should be left between the rows. When sown in a small way they should be put in 6in. apart with 2ft. between the rows. Broad beans were the best for winter, and should be sown 6in. apart and 3ft. between the rows. Carrots and parsnips were difficult to grow, and should have a trench 18in. deep dug for them, to be half filled with manure. Mr. J. N. McCallum said that though the practice of sowing peas 6in. apart might be all right in rich soils, he had found that in poor soil they did better sown thicker, say 1in. apart, as they helped to support each other. Mr. Strothers, in reply, said 4in. or 6in. was preferable.

Yadnarie, May 25.

PRESENT.—Messrs. W. Brown (chair), L. H. Marston, J. A. Kruger, G. A., C., and F. Dreckow, F. W. and A. Jericho, A. Spriggs, C. W. Mowat, R. B. Deer, R. Parbes, F. Stubings, G. Kobelt, J. J. Deer (Hon. Sec.), and three visitors.

HORSES, COWS, PIGS, AND POULTRY.—Mr. J. A. Kruger read the following paper:—“Every farmer should breed his own horses. Horseflesh is very expensive, and the farmer who has a good draught colt to sell is as well off as the one who has a hundred bags of wheat, as prices are ruling at present. As soon as our scrublands become more developed it will be an easy matter to raise a few foals each year. Horses that are bred on a farm are generally better than horses bred on a station. They are more docile, and frequently turn out better workers. If the sire is a good-tempered animal and the dam is a good, kindly worker, the progeny will most likely be good. The Suffolk Punch is better than the heavy draught for farm work, because it is more active and hardy. I consider this breed the best plough horse, because it is more clean legged, and does not tire so quickly on heavy land. It is strongly built and possesses good bone. For the wagon I am in favor of the Clydesdale, because it can carry more weight and is capable of drawing heavier loads than the lighter breeds. Every farmer should keep three or four cows. Milk and butter are a great help in the household. Do not keep many young cattle, as they are slow in growing and are rough on the fences. I prefer the Shorthorn to any other breed. They are the best all-round cattle for the farmer. Have two cows in milk at a time, so that milk and butter may be available all the year through. A good cow should average 7lbs. to 8lbs. of butter per week. They will do very well on cocky chaff mixed with a little hay chaff. An acre of sorghum or maize should be sown for the summer months. Pigs can be kept at a profit if managed systematically. They can be kept very cheaply on the farm. A few acres of barley should be sown each year to provide feed. The Berkshire is better than any other breed for bacon, and pigs of this breed are very easily kept in condition. Farmers should cure enough bacon for their own use. Poultry should always be kept in good numbers to provide a supply of eggs for the farmer's household. There is always a good demand for any surplus. Fowls can make a good living in the farmyard, and there is nothing that goes to waste if they are allowed to run loose. White Leghorns are the best layers; Silver Wyandottes are a good all-round fowl for laying and for the table.” In discussing the paper Mr. Dreckow agreed with the writer that the Suffolk Punch was a good hardy horse for farm work. Mr. Brown preferred the Clydesdale, as it was of a quieter nature. Members agreed in the opinion that, although the station-bred horse was generally more hardy, the farm-bred animal was the better, as it was usually more quiet.

CUTTING MALLEE SHOOTS.—Members expressed the view that it was always advisable to cut mallee shoots as close to the ground as possible.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, May 31.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Bone (chair), G. E. and R. F. Venning, Hill, Wall, Gurner, A. Fidge (Hon. Sec.), and two visitors.

THE FARM.—Mr. A. J. R. Gurner contributed a paper in which he laid down some general principles regarding farming generally. The homestead, he said, should be put on rising ground, and should be surrounded by soil suitable for providing a garden and experimental plots. It should be as near the main road as possible, which obviated the necessity of making private roads. The proximity to water should be considered, and a belt of scrub surrounding the buildings to provide shelter was also a good idea. The house should face the main road, and the workmen's quarters should be handy to it. The workshop should be large enough to accommodate any machine likely to require repairing, and the implement shed, likewise, should be of sufficient dimensions to accommodate all machinery and implements. The chaffcutter house should be alongside the barn, so that the chaff could be easily stored, either in bins or bags. This barn could also hold the oats, &c., for horse feed, and the seed wheat and fertilisers. The stables should, in this district, face the east, and be closed on the other sides. They should be away from the house, so that the flies and odors did not reach it. The fowlhouses, pigsties, and cowyards should likewise be as far as convenient from the house. The road along the buildings should be grubbed and made as well as possible, and plenty of room should be left for the wagon, &c., to be turned round. The paddocks should, wherever practicable, be square, with those near the house rather small and those farther out larger, according to the idea of the farmer. If they were square they were easier to cultivate and cross plough, as there was not a long land one way and a very short one the other. The paddocks should have some scrub left in them for shelter for stock at all times—summer and winter—and for breakwinds. Pieces of land half a chain square should be left uncultivated in convenient places, to act as cleaning floors. A floor that had not been ploughed up could be kept fairly clean, and very little grain would be lost. If the cleaning floors were near the fence they served for two paddocks when a gateway was left through the fence for the strippers. The road also should be along the line of fence, in order to serve two paddocks or more all the way along. All the work on the farm should be well done, and all fencing, buildings, stables, barns, &c., should be strong. The more substantial everything was the more economical it would be. In discussing the question, members gave their opinions as to where the different outbuildings should be situated. Mr. Venning stated that the cowshed should be some distance from the stable, as cows were likely to gore the horses, and would also chew harness if they got an opportunity. Figs should be kept in confinement, as they were very destructive.

Geranium, May 31.

PRESENT.—Messrs. W. Mitchell (chair), I. J. and W. J. Mitchell, W. and F. Hammond, F. C. Norton, McAuliffe, G. Charlton, Lang, Lithgow, Wendelbourne, Dohnt, Threadgold, Bowden, Jacob, Pannell (Hon. Sec.), and six visitors.

POULTRY.—Mr. C. R. Dohnt read a paper on this subject, in which he expressed the view that every farmer should keep about 100 young hens. These should be disposed of when they reached the age of two years; and he had found it advisable not to keep to one breed, but preferred a few of several kinds—White Leghorns, Black Orpingtons, and Silver Wyandottes being good farmers' fowls. However, these should not be allowed to intermix. Eggs should be selected from the best for incubation. Hatching should be discontinued after October 1st. Chickens hatched after that date tended to become small, and were very susceptible to various poultry ailments. Hens were better for rearing chicks than the incubators, as the latter required a great deal of attention. A good strain of fowls to the number of about 100 should go a considerable way towards paying the store account and keep the household in meat and eggs. In discussing the subject Mr. F. Norton said that to make poultry pay a farmer must have special interest in and adaptability for the business. Mr. Wendelbourne thought a cross was better than the pure breeds, as the former were hardier.

Lameroo, June 1.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. J. Trowbridge (chair), F. W. and C. R. Eime, O'Connor, Thyer, Ross, Jericho, Leckie, Lehman, Sinclair, Marshall, W. J. and S. G. Trowbridge, Mathias, Wray, Blum, R. B. and A. J. H. Koch (Hon. Sec.).

BREEDING AND MANAGEMENT OF SHEEP.—Mr. W. J. Trowbridge contributed a paper as follows:—"My object in writing this paper is to offer suggestions that may prove beneficial to the farmer, more especially the wheat farmer. The best sheep to keep on a farm are undoubtedly the Merinos. They are good doers, and as a rule do not cause trouble with the fences. Keep about 100 ewes for breeding purposes, besides a few for killing. There are several good breeds from which to choose the ram, viz., the Shropshire, Dorset Horn, Lincoln, Leicester, South Down, and Romney Marsh. Of these the most fancied is the Shropshire, as it has proved a valuable early lamb getter. The lambs grow very quickly, and realise fancy prices. The ewes, if procured young (say four-tooth), will throw a lamb every year, and also cut a very good fleece; but great care should be taken not to overstock. I have been keeping a few sheep ever since I came here, and although I have not gone in for them extensively, on account of the shortage of feed, I feel assured from the results I have had, that in the near future mixed farming will be carried on very profitably in this district. To grow heavy crops we must fallow, and what is more suitable for keeping fallow clean than a flock of sheep. They eat weeds that no other stock will eat, and, in addition, manure the ground. Even the farmers who cannot afford to buy ewes for breeding would do well by getting a few for killing purposes. The skins, if looked after, will help considerably in keeping the expenses down."

Mr. J. Marshall read the following paper:—"In the southern part of this State, that is to say from Adelaide southwards, Lincoln and crossbred sheep pay extraordinarily well. In these parts it is rather too cold and wet for Merinos to thrive as they do north of Adelaide. When breeding in the South we usually select first cross ewes, from two-tooth up to full-mouth. These are produced from Merino ewes and a Lincoln sire. With these first cross ewes we mate a Lincoln ram, if the lambs are required for wool and mutton; but if for lamb production we use Shropshire, South Down, or Dorset Horn rams. The ewes produced from the first cross ewes and the Lincoln ram are bred next to a Merino ram, thus producing a comeback. The ewes of this class are most eagerly sought for at the present time, and I believe bring higher prices than any other ewes for breeding purposes, that is, outside of stud classes. The wethers are among the very best as mutton sheep, and are also in the first class as wool producers, often cutting as high as 15lbs. of clean wool, bringing the highest price in the market. I have dressed a wether of this class that cut 15lbs. of wool and dressed 115lbs. of mutton, together with 16lbs. of caul fat. Comeback ewes would be the best class for this district. I have also had some experience among Lincolns, as I bred a small stud for several years. In the first place I bought two Lincoln ewes. These lambed to a first-class Lincoln ram. From these ewes I got two ewe lambs. At 10 months old these ewe lambs, as hoggets, cut 12lbs. of clean wool. The next year, as four-tooths, they both had lambs. One of them had twins, and she cut that year, when rearing the two lambs, 12lbs. of wool; but the other ewe, rearing one lamb, cut 15lbs. of wool, and the three lambs cut about 6lbs. of wool each. When choosing a Lincoln ram for the purpose of wool-growing, I should not select one that, if kept for stud purposes, would not cut 18lbs. to 20lbs. of clean wool as a four-tooth. An ewe, if dry, should cut up to 15lbs. of wool. For fat lamb production I have found no sire to equal the Shropshire, if mated with the class of ewes which best suit the locality. The lambs are not wool-producers; and I would ask you to bear in mind that a wool-producing lamb is not a good fattening lamb. With regard to the general management of sheep, it is necessary to give them plenty of feed and good clean water. Attend to their general health by dipping once a year, to clear them of tick and lice. Breech them just before winter each year, and it will more than repay you. If very woolly around the eyes, clear them. For breeding purposes, pick out the very best ewe lambs, and do not resort to the bad habit of selling the best and keeping the culls. This, I am sorry to say, is what I believe a lot of our breeders are doing. In choosing the rams, select good, healthy, square animals, well breeched, and possessing nice heads. Small paddocks, with frequent changes are advisable. For fattening I do not know of anything better than lucerne and peas. Extra prime and weighty lambs sold this week in the Adelaide market realised up to 23s. 6d. each. It would be found that the majority of lambs which returned these prices were pea fattened." The papers were discussed at length by members. Mr. Mathias said many losses had occurred in mating Shropshire rams with Merino ewes on account of the Shropshires being a much stronger breed. Mr. Leckie said sheep could

not be kept in this district for any length of time, as their teeth became sharpened, a large percentage of the ewes died at lambing, and lambs were born deformed. The Lincoln and Leicestershire cross had been tried, but with the same results. The only sheep that could be profitably kept was the Merino. The clip usually averaged 8lbs. of clean wool per sheep, and this was known as "blue wool," and always returned top prices in both Australian and London markets. The Hon. Secretary had noticed that the sheep in this district did very well on a little feed, which showed that there was plenty of substance in it.

Monarto South, May 1.

(Average annual rainfall, about 15in.)

PRESENT.—Messrs. A. P. Braendler (chair), G. A. Hartmann, R. Hartmann, J. Hartmann, R. E. Anders, E. Tilbrook, F. C. Thiele, B. Hoff, C. F. Altmann, A. Harper, J. Frahn, H. Frahn, J. G. H. Paech, C. Hill (Hon. Sec.), and four visitors.

WATER CONSERVATION.—Mr. G. A. Hartmann read the following paper on this subject :—"The supply of water for our households and stock is one of the most important matters with which a farmer has to deal, and the value of a good water supply can hardly be over-estimated. Every farmer should build enough tanks on his farm to give him a water supply for 12 or 18 months. If water cannot be obtained by sinking, as is the case in many districts, and especially in the mallee country, tanks should be built. They should not be smaller than 25ft. by 16ft. and 8ft. deep for underground tanks, and 25ft. by 16ft. and 6ft. high for surface tanks. As there is an enormous pressure, bars of $\frac{1}{2}$ in. round iron, with nuts and plates on each end, must be put in the walls, and when the tank is finished screwed as tightly as possible in order to keep the walls from cracking. It is advisable for underground tanks to be on sloping ground. A trench could be dug on a level with the bottom of the tank, and 1in. pipes built in when the wall was started, the pipes being placed 2in. above the floor. This will save a lot of water-pulling or pumping. I have two tanks built above ground as described, and they answer their purpose well. Implement sheds, barns, and horse stables should be built with iron roofs in order to catch all the water possible. Thousands of gallons could be stored if fair-sized tanks were built. Dams should be scooped wherever a good catchment area exists and the ground is not too porous, as they are a great help for a time. In most cases they are empty when the dry seasons come, and the farmer then finds himself reduced to water-carting—the most expensive and unsatisfactory task he has to undertake on his farm." In discussing the paper Mr. J. Hartmann said it was advisable in salt country to build the insides of tanks of brick and cement. Mr. G. A. Hartmann advised making the bottom of tanks of cement concrete.

Monarto South, June 1.

(Average annual rainfall, about 15in.)

PRESENT.—Messrs. A. P. Braendler (chair), R. E. Anders, A. Patterson, G. Patterson B. Hoff, J. Hartmann, J. Frahn, H. Frahn, H. A. Hein, E. Tilbrook, F. C. Thiele, G. Paech, C. F. Altmann (Hon. Sec.), and seven visitors.

FENCING.—Mr. J. Hartmann read the following paper :—"In erecting a fence it is important to have good posts. Soft wood and saplings subject to white ants should be avoided. Posts should not be less than 4in. in diameter at the small end. It is advisable to place wooden posts 27ft. apart, with one iron standard between them. Place a 14 by 3 barb wire on the top, with the next wire 10in. below this. Place the third wire 10in. below the second, and the next three wires 6in. apart. If fencing for big cattle No. 8 wire should be used. Strainers, which are very important, should be placed 3ft. in the ground, with struts properly adjusted, as they are apt to give way in wet seasons if the struts are weak. If the fence is intended for sheep, only iron posts 15ft. apart with six No. 10 wires and a strainer at every interval of 10 chains need be used. When the ground is soft a man can hammer in 200 posts in half a day." In the discussion which followed members generally agreed with the paper, but favored 12 by 3 barbed wire instead of 14 by 3, as it would last much longer and prove the cheaper in the end.

SEEDING OPERATIONS.—The Hon. Secretary read the following paper :—"The seed should always be cleaned well, grading being the preferable system. When properly cleaned, it will run evenly through the drill. Always see that it is true to name. A change at least every third year is a very good thing. Pickle the seed at least three days before using, so that it will be properly dry, and will run evenly through the drill. If it is dry the super. will not adhere to the grain. I find this to be the cause of malting in a good many cases. When starting seeding it will pay to jack up the drill and turn it by hand to see that it works smoothly. There should then be no trouble during seeding

time, especially if the fertiliser distributors are cleaned occasionally. I prefer cross drilling to any other method, but as it takes considerable time, it can only be done when we have an early season. If the season is early, with good rains at the beginning of April, and the fallow is fairly clean, the broadcast seeding attachment to skim ploughs may be used, and this is almost equal to cross-drilling. I do not like this method when sowing late. The crops will grow quicker in the cold weather if the seed is sown in rows with the manure. When sowing early I can see no difference in the growth of seed drilled and that broadcasted." In the discussion which followed, some members said that they would not pickle at all when sowing dry, as the wheat under dry conditions was little troubled with smut. Some made a practice of cross-drilling for hay, but not for grain. Members favored cross-drilling in wet seasons, and agreed that although a too heavy dressing of manure was of no use to the crop, there was a benefit in that a good crop of feed was secured in the subsequent year.

Moorlands, May 3

PRESENT.—Messrs. L. Spurr (chair), A. and H. Miatke, C. Bauer, C. B. P. Neumann, R. Spurr (acting Hon. Sec.), and one visitor.

SORE SHOULDERS.—The following paper was read by Mr. Bauer:—"As one moves about amongst the different owners of horses one sees many treatments for sore shoulders. A team of six or seven horses comes in after a day's work, and several are singled out, and a gag or twitch is fastened on to the nose or mouth. A long stick with a good lump of rag tied on to the end of it is dipped into a pot of some ointment and is applied to the horse's sore. Next morning a sort of crumbly, mattery crust has formed on the sore, and as soon as the weight of the collar comes on to it it is removed and sticks to the collar, and the irritation is worse than ever. Everyone will admit that it is almost impossible to bring a team of horses through a season's work without being troubled a little with sores; but a great deal of it can be avoided and prevented. In the first place, particularly when work is commenced, great care should be taken that the collar fits. It must fit in close to the neck, not too tightly. If there is any play the collar will, as the horse walks, slip from side to side. This is the first cause of sore shoulders. The collar should be the right length; it should meet on the top when it is buckled up. A collar that is let out, sometimes to the last hole in the strap, and does not meet by about 3in., is by no means a good-fitting collar. It should fit at the bottom so that one can just put the flat hand inside of it. A pipe collar can fit a little closer. Sometimes we see a collar that has a big lump of bag stuck underneath it. This is a bad practice, as the top of the collar will not fit in close to the horse's neck, and certainly will sooner or later give the horse sore shoulders. Then we must see, by rubbing the hand over the lining of the collar, that there are no lumps on it. It does not matter whether the collar is newly lined or not, these lumps will sometimes form and cause irritation and eventually a sore. Then there is the condition and health of the horse, which also has a lot to do with sore shoulders. A horse that is in good health, that keeps his condition while he is working, and has a good-fitting collar, will seldom or never get sores. To keep the horses in good health, to my mind nothing is better than a regular course of bran in the feed. Do not over do it by any means, but put a double handful in the feed of chaff, together with a little corn. When once the horse begins to fall away in condition the trouble begins. Some horses are more subject to sores than others. For the treatment of sore shoulders I have never found anything better than lard, or even clean fat, with the addition of blacklead. This forms a glossy surface on the sore as well as on the collar. The collar should be eased a little by pounding, or still better by taking an awl or sack needle and working the hair under the lining to a different place. Care should be taken not to form a lump. Oils or sharp ointments are useless unless the horse is turned out. Another thing I have always found helpful is to have a piece of collarcheck sewn on to the top of the lining of the collar, thus giving it a double lining. As soon as a horse shows any signs of a sore, cut a hole out of the outside lining in that particular spot. This is only necessary with horses that are very susceptible to sores. Cutting deep holes into a collar is a bad practice."

Parilla Well, May 30.

PRESENT.—Messrs. J. E. Johnston, D. and J. Ferguson, J. W. Johnston, J. and W. Mavel, J. E. Johnston, A. E. Seary, E. H. Leak, S. T. and T. Burford, F. and A. Foreman, H. and W. Austin, H. Leak, L. G. Neville (Hon. Sec.), and seven visitors.

SEED WHEAT.—The following paper was contributed by the Hon. Secretary:—"The character and quality of the seed we sow is one of the most important factors in the ultimate yield of the crop, and I propose to-night to bring before you a few observations and deductions with regard to germination, pickling, selection, and improvement of seed. The germination is influenced by the method of harvesting and pickling adopted. Some say that there is a variation in different varieties, but this is a point I have not noticed personally. Wheat that is reaped in damp weather usually germinates much better than that reaped in very hot weather. I also find that wheat reaped with ordinary strippers germinates better than wheat reaped with harvesters. The methods of pickling wheat are too numerous to go into to-night; but of the three usually adopted in this district, viz., turning on a floor, plunging in bags, and the McCabe method, the first is the best. Plunging in bags is very unsatisfactory, because it is shown under the microscope that at every point of contact between the grains the water fails to wet the surface, and should there be any spores of smut on these joints, that grain will probably be affected with smut. The McCabe method theoretically is a perfect one, but my experience is that it is too slow. During this last 10 years or so Australian experts have made great strides in improving and introducing new varieties by selection and cross-breeding, so that at the present time most of the varieties grown are either selected or crossed; but it is to pedigree selection that we will have to look for further improvement. An instance of the improvement that can be made by this method came under my notice in a crop of King's Early and a crop of King's Red growing side by side; whereas the King's Early had only seven spikelets per head, the King's Red had an average of 10. When we come to look round the wheat fields in this district and see the great mixture of varieties, and the tendency most of the newer varieties have to degenerate, it leads us to ask ourselves whether we could not do something to improve the seed wheat supply of this district; and I submit a scheme for your consideration that I think will do something in this direction. The objects of this will be to (1) encourage the selection of wheat, (2) keep up a good supply of seed, (3) gauge the maximum yields that can be obtained by good cultivation, &c. The scheme could be worked in conjunction with the Pinnaroo Agricultural Bureau and Agricultural and Horticultural Society, if agreeable, and would be as follows:—A trophy to be offered for the highest aggregate yield from a $\frac{1}{4}$ acre of land over a period of three years. The first year the seed to be true to the type of variety entered; the second and third year's seed to be selected from the crop grown during the preceding year. Competitors to be free to choose ground, method of cultivation, quantity of seed and manure per acre. Competitors to have the right to make as many entries as they feel disposed, each entry to be of a different variety of wheat." In discussing the subject, Mr. J. W. Johnston said that there was a large percentage of grain cracked by the harvesting machinery. This was not visible to the naked eye. He had used the plunge method of pickling wheat of late years, and had always found it effective in checking smut. Mr. J. S. Johnston said that wheat sometimes became affected with smut in passing through drills and other machinery that had been used for handling smutty wheat. He considered the wheat competition a good idea, as Australia was behind most of the other countries of the world in yield and quality. Mr. J. S. Ferguson favored the idea of the Bureau getting seed from the Government wheat-breeding stations and distributing it amongst the members.

Parrakie, May 18.

PRESENT.—Messrs. F. J. Dayman (chair), O. and C. Heinzel, W. Threadgold, R. F. Brinkly, F. W. Randall, A. C. Hameister, J. G. Temby, N. J. Good, C. E. Hammond, F. S. Dayman, J. O'Hara, H. Diener (Hon. Sec.), and four visitors.

ENGINES ON THE FARM.—Mr. J. Temby read a paper on this subject, in which he expressed the opinion that an engine should form part of the plant of every farm of any size at all, especially if many horses were kept. The portable engine was more suitable than the stationary, as with the former two horses could be hitched to it and it could be dragged to any part of the farm where required. The oil engine was more reliable and less costly to run than the petrol engine. Several members, in discussing the paper, spoke in favor of the oil engine, whilst others favored the petrol engine.

Parrakie, June 22.

PRESENT.—Messrs. F. J. Dayman (chair), W. Threadgold, M. Kildea, A. J. Beelitz, N. Good, R. E. Jose, J. G. Temby, F. W. Randall, F. Gravestocks, H. Diener (Hon. Sec.), and four visitors.

PLOUGHING OR CULTIVATING NEW LAND.—The relative values of the plough and cultivator for working new land were discussed. Mr. Beelitz expressed the view that the plough turned up too much sour soil, and he would not use this implement except for fallowing. The cultivator mixed the ashes with the soil, and it would generally be found that the wheat came up better than was the case with ploughed land. Mr. Threadgold had secured the best crops from cultivated land; but, with the exception of new land, it was hard to beat fallow. Mr. Jose favored the disc cultivator, and said the farmer could go twice over the land with it in the time that it took to plough the same area. Harrows were not used often enough in this district. Mr. Temby had fallowed some scrub, and had rolled and burned an area alongside. Both were disked before seeding, and up to the present the fallow was ahead of the other crop. The Hon. Secretary preferred the cultivator after a good burn, and also thought more harrowing should be done. Harrows with three rows of tines were best for this district.

ROLLING SCRUB.—The general opinion of members was that scrub should be rolled early, in order that it might dry well before being burnt. If it were light it should be rolled in January or February, and the springbacks could be cut and burnt about a fortnight later. Mr. Gravestocks said light scrub burnt better soon after rolling, as if it were left too long the gas would escape from it. Mr. Temby had found the best way to deal with burnt scrub was to roll and disc it. He would fire rake it after harvest, and then pick up what was left with a tiger rake. Mr. Good would rather roll and cut any scrub that was left, as he thought a good burn was better than a good deal of cultivating. Mr. Beelitz would not roll heavy timber too early. September was a good month. If rolled earlier it would be found that the leaves and small branches set down flat on the ground, and the fire would not get at them. The Hon. Secretary agreed with Mr. Temby that disking down mallee shoots was the best scheme. It was a cheaper and quicker way to clear the land than any other.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, May 28.

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. S. Chapman (chair), C. Ricks, J. Brumby, A. Broadbent, A. R. Stone, J. Tozer, J. Lewis, J. Mildwater, G. Hicks, T. Jacobs, sen., A. Jacobs, Tom Jacobs, jun., H. Lewis, C. Lewis, S. H. Curnow (Hon. Sec.), and one visitor.

THE SEASON.—Mr. Jacobs said this season was the most disastrous he had ever known. If a cold snap should set in he was afraid it would go hard with many of the old cows in the district. There was no old feed to carry them through.

APPLES AS PIG FEED.—Mr. Ricks had recently sold nine pigs which had been running in a small orchard, and they had realised £12 at the sale. Other than the apples and £1 worth of peas they had had nothing to eat. Allowing for the original cost of the pigs, he considered that he had made a clear profit of £7, and the whole of this was derived from otherwise waste apples.

BERSEEM.—Mr. Ricks reported on the growth of several plots of Berseem clover. From present indications it was not likely to give the returns which it had been reported to have yielded in the warmer climates.

HARNESSES.—Mr. S. W. Chapman read the following paper on this subject:—"To the man on the land the harnessmaker's account is by no means a small item, and as leather is an article that will very soon deteriorate if neglected, it behoves us to take every possible care of our harness. The carelessness of some people in the treatment of their harness is simply astonishing; not only in regard to the cleaning, but in the manner in which it is left lying about when not in use. And in this respect it has truly been said that quite 50 per cent. of the harness made is knocked out, not worn out. All harness should receive at least two dressings of oil or harness composition per year, to keep it in anything like condition. For heavy harness I recommend the following treatment:—Take it to pieces, wash it thoroughly with warm water, using soap if necessary; and when dry apply a dressing of some animal oil, neatsfoot for preference, or curriers' fat black. Either of these dressings are very beneficial to the leather, easy to apply, and are very penetrating, thus keeping the leather soft and pliable. It is frequently stated that the application of neatsfoot oil will in time rot the stitching. This may be so, but there is a great deal more chance of the harness perishing through the want of it than from its application.

For light harness, after taking it to pieces and washing thoroughly, I would recommend curriers' fat black for general purposes; but if a better appearance is desired, a dressing of Harris harness composition will meet the case. For the buckles and mountings use brilliantshine. One secret in preserving harness is to keep it in repair. By this I do not mean that we should go running to the saddlers for all our small repairs. Given some wax thread, a few awls, and a good assortment of copper rivets, a handy man can do a good deal towards keeping his harness in good order; and by a little care and attention in this way a considerable saving can be effected. Having got the harness into good order to keep it so it is essential that you should have a room, or at least a separate compartment, in which to hang it when not in use. Let the room be provided with plenty of hooks and pegs, so that the harness is not all crowded on to a few supports. By this means one can get what harness one requires without tossing the whole lot about, which is much to the detriment of the harness and the user's time and temper." The paper was discussed at length. Mr. Mildwater used mutton fat and neatsfoot oil to preserve his harness. Mr. Jacobs did not think that neatsfoot oil would cause the stitches in the harness to rot. Mr. Broadbent said this was due to the sweat from the horse, and harness should always be wiped with a cloth after being used. Mr. Hicks had a pair of winkers in use after 37 years' wear. They had been well cared for and cleaned with neatsfoot oil, and some years ago with castor oil. Mr. A. Jacobs had noticed that where harness was hung in a damp shed, drops of water would condense on the leather. Members attributed this to the salt contained in the sweat from the horse.

Clarendon, May 27.

(Average annual rainfall, 33½ in.)

PRESENT.—Messrs. E. A. Harper (chair), J. and L. Spencer, A., H. C., and A. A. Harper, C. Matthew, J. Piggott, C. C. Spencer, T. B. Brooks, H. Tester, F. Shierlaw, C. G. Carvosso, A. Phelps (Hon. Sec.), and one visitor.

IMPORT DUTY ON MANURES.—After a long discussion it was decided that the Branch enter an emphatic protest against the proposal to impose a duty on imported manures.

GROWING AND PRESERVING HAY.—A paper on this subject was read by Mr. H. Tester, in which he stated that a good crop of hay could not be expected unless the ground were thoroughly prepared for the seed. For a hay wheat he recommended White Tuscan, which variety had a fairly green straw right down if cut at the proper time; and it would be found to grow high and weigh well. Bluey, a wheat that cut excellent chaff and weighed well, was also a good variety. The crop should be cut when the bloom was still on the plant, and it should be allowed to lie for at least a day before being stooked up. The stooks should be built with the sheaves as upright as possible. This, in the event of rain, would minimise the damage. Small stooks were better than larger ones. Ten or 12 days of good drying weather would be plenty of time for the hay to mature; but if the atmosphere were damp, perhaps four or five weeks would be required. Farmers could start stacking for their own use some time before the merchant. The merchant got 30 loads in a stack compared with the farmer's three or four; but the hay might not have time to dry if it were at all fresh. If hay were stacked in good order, and not allowed to get wet, it would come out in good order. A stack should be allowed to spring a little at the ends and sides, so that the rain would drip clear. The most important item in preserving hay was the roofing. Some farmers expected to keep the rain out by pitching a few loads of straw on the stack to act as a roof. Although it took a few days longer to properly thatch the roof, it paid better in the end. A thatch would, with care, last several seasons. For a small quantity of hay an iron shed was best. Members did not favor King's Early for feeding to horses. As a general rule flat stooking was not at all satisfactory in wet districts. In this district, where the land was deficient in salt, some members had found it advisable to salt their stooks heavily. Others, however, preferred placing rock salt in the mangers when feeding the hay.

SEED GRADER.—A number of members of this Branch had co-operated and purchased a seed grader, and samples of graded seed were exhibited at the meeting.

Gumeracha, April 29.

(Average annual rainfall, 33 in.)

PRESENT.—Messrs. J. Porter (chair), A. Moore, J. B. Randall, H. V. Cornish, H. Norworthy, J. Monfries, and V. F. Lee (Hon. Sec.).

DAIRYING.—Mr. Maidment delivered an interesting address on this subject. The Shorthorn, he said, was the most suitable cow for the dairyman, as it was hardy and could be fattened and sold at a good price when the milk yield began to fail. The milk from this breed generally was heavy and rich in cream, and the calves, when fed on whole milk for the first 10 days and then on skim milk for three months, could be sold in the market at 10s. each without any trouble. The Ayrshire was a good cow, and the Jersey also was thought a good deal of, but these were not equal to the Shorthorn. An excellent cross was secured from Jersey cows mated to a Shorthorn sire. The growth of fodder crops, such as lucerne, maize, mangolds, and sorghum was essential to profitable dairying. The milking herd should be fed from early February on in order to keep up their condition and the milk supply during autumn and winter. Milking and feeding should be both carried on regularly. Cows about to calve should be kept under the eye of the farmer. They should be allowed a spell of about two months between drying off and calving. Cleanliness was imperative: the hands of the milkers should be washed in warm water and the cows' udders should be likewise treated.

Gumeracha, May 28.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. J. Porter (chair), D. Hanna, J. Monfries, H. Norsworthy, A. Moore, B. Cornish, and J. B. Randell (Hon. Sec.).

QUESTION BOX.—The evening took the nature of a question box, and the following matters were dealt with:—

Destroying Rats.—Mr. Monfries said the best way to poison rats was to place a mixture of dry pollard (two parts) and plaster of Paris (one part) where the rodents congregated.

Pig Paralysis in Hind Quarters.—The Chairman stated that cases of pigs showing signs of paralysis in the hind quarters had come under his notice. A *post-mortem* examination showed that they were infested with worms. A quarter tablespoonful of areca nut would relieve the trouble.

Hartley, May 25.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), W. Brook, F. Brunes, D. Clark, S. Pratt, J. Tydeman, G. Phillips, J. M. Hudd, G. Hill, W. Bermingham (Hon. Sec.).

IMPORT DUTY ON SUPER.—Members were unanimously of the opinion that the imposition of an import duty on superphosphates would seriously hamper farming operations, and the Branch decided to oppose this suggestion.

CHAFF BAGS.—The Chairman contributed a short paper in which he drew attention to the high prices ruling for bran bags, and suggested that the importation of 4tush. wheat bags should be allowed, for the purpose of providing suitable packages for chaff. Bran bags were too dear and were too easily worn out to be suitable for this purpose.

Ironbank, May 31.

PRESENT.—Messrs. G. Pole (chair), R. Coates, F. S. Coates, C. Morgan, E. Coates, L. Ahrens, J. Morgan, W. Coates (Hon. Sec.), and four visitors.

APPLE CULTURE.—Mr. R. Coates contributed a paper, in which he stated that the first step in regard to the planting of an orchard was the clearing of the land. After this was done, and the first rains had made the soil soft enough, it should be ploughed or grubbed. If it were of a loose loamy nature the cultivation need not be so deep as where heavy soil existed. It should be broken up to a depth of from 18in. to 2ft. Holes for the trees should be 2ft. 6in. square and 18in. deep, and the bottom of the holes should be loosened further to a depth of 9in. or 10in. Three or four pounds of coarse bonedust or some decayed vegetable matter should be added to and thoroughly mixed with the subsoil that had been loosened in the hole. Continuing, he said—"After this is done the hole should be filled in, and at intervals a little bonedust well mixed with the soil, in order to feed the tree until it becomes established. A hole should then be dug out, sufficiently large to enable the roots to spread out. Place a stone or a clod of soil in the centre of the hole. Put the tree on this, comb the roots all round in a downward direction, and put a little fine soil over them. Fill in the hole till the soil becomes a little

higher than that surrounding, in order to keep the winter water from standing around the stem of the tree. It should then be pressed, but not too heavily, as the winter rains will set the ground. The best time for planting all fruit, except citrus trees, is June and July. This gives them an early start, and they make fresh roots. Just before the dry weather sets in it would be a great advantage to the young trees if they were lightly forked around and mulched with old grass or some other litter, to keep the ground cool throughout the dry weather. The manuring and pruning should be followed up yearly, especially with the young trees. The leaders should be cut back according to their growth. If a tree is growing vigorously its leaders should be cut back to a length of about 8in. to 10in., and kept fairly open in the centre. I tried hard pruning with Dunn Seedlings with good results. The apples were larger, and few were cracked. After pruning, manuring and cultivating should be done. This is usually needed in August, just before the trees begin to make fresh root growth. The manure used is generally bonedust or bone super., which is sown on the surface and ploughed or dug in. The quantity of manure per acre depends on the size of the trees. If they are large, 6cwt., to 7cwt., of manure per acre is not too much." In discussing the paper, some members were of the opinion that the loosening of the soil in the bottom of the hole to a depth greater than that to which the cultivation had been done was of no benefit. Mr. G. Pole was of the opinion that hard pruning decreased the tendency of apples to crack. Mr. Jacobs thought the pruning had little to do with the cracking of apples, which he attributed to weather conditions.

Kanmantoo, June 1.

PRESENT.—Messrs. W. Downing (chair), R. Downing, R. Talbot, H. Shepherd, L. Woolley, R. Critchley, S. Downing, J. Mills, W. C. Mills (Hon. Sec.), and one visitor.

DAIRY FARMING.—Mr. R. Downing read a paper on this subject. By paying more attention to the breeding and rearing of dairy cows, he said, the farmer could easily make dairy farming, in conjunction with general agriculture, pay well. When building up the herd it was necessary to select the best cows procurable, and the selection of the sire was equally important. He preferred the Shorthorn breed, because, in addition to being good milk yielders they sold well as fat cattle. Once the herd was established, culling should be commenced, and this could only be done properly by testing each cow separately. Heifers should not be mated when too young; about three years of age being the best time. Calves should receive careful attention and plenty of good feed. Green feed was the best, and it would more than pay to irrigate for providing this. Where nothing else was procurable, cocky chaff mixed with a little bran was readily eaten by the cows in winter, although a heavy milk yield could not be expected when cows were fed on this. In discussing the subject, members generally agreed that the Shorthorn was the best breed for the farmer, as when the milk yield began to fall it could be easily sold for beef. It was considered, however, that the Jersey was the best butter maker, and as a rule would mature earlier than other cows. Molasses was useful when green feed was not available. It was cheap and, when used with dry chaff, very palatable.

Kingscote, May 13.

(Average annual rainfall, 18½in.)

PRESENT.—Messrs. J. Turner (chair), P. T. Bell, J. Wright, B. H. Bell, J. Codling, M. J. Chirgwin, F. W. Jacka, W. H. Strawbridge, and W. F. Cook (Hon. Sec.).

IMPORT DUTY ON MANURES.—Members discussed at length the proposal that an import duty should be imposed on superphosphates, and strongly condemned the suggestion as inimical to the best interests of the farmers.

PEANUTS AND APPLES.—Mr. J. Wright tabled some fine samples of peanuts which were grown by him at Cygnet River. It was thought that this nut could be profitably grown here. Mr. Noske had some roots on which were 200 nuts. Mr. F. Jacka tabled three samples of apples of beautiful appearance and free from bitter pit. They were much admired by members. There were thousands of acres of land on the island suitable for apple-growing.

Kingscote, June 3.

(Average annual rainfall, 18½in.)

PRESENT.—Messrs. J. Turner (chair), P. T. Bell, J. W. Codling, P. Bromfield, M. J. Chirgwin, F. Wood, R. J. Cook, A. H. Anderson, V. H. F. Cook (Hon. Sec.), and four visitors.

EXHIBITS.—Mr. P. Bromfield tabled some fine heads of maize of Hickory King, Eclipse, and Moruga varieties, which were well cobbled up. The seed had been sown in September, and the crop had ripened in February and March. It had received no irrigation or manure. Mr. Bromfield expressed the opinion that there were thousands of acres of land on the Island suitable for growing maize. He thought that where a clay subsoil supported sandy soil there would be excellent opportunities for dairy farming. Members agreed that maize could be profitably cultivated on Kangaroo Island, and an instance was given where it had grown to a height of 15ft.

Longwood, June 1.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. W. H. Hughes, J. and W. Nicholls, A. F. Furniss, H. Vogel, J. Brown, G. W. Doley, E. H. Glyde, E. J. Oinn, J. C. Blakley, J. Roebuck, J. R. Coles (Hon. Sec.), and three visitors.

HOMESTEAD MEETING.—The property of Mr. W. Nicholls was inspected. The recent bush fires had passed through part of the orchard, and a number of trees about five or six years old were apparently dead. Members were of the opinion, however, that they were alive below the surface of the ground, and could be grafted. As they were well rooted they should develop quickly.

GRASSES.—There had been practically no rain up to the date of the meeting, but various planted grasses and clovers were appearing above ground.

DESTROYING GOLDFINCHES.—For destroying goldfinches members recommended the steeping of canary seed in milk, and then sprinkling with arsenic. The birds would take this readily.

BERSEEM.—Mr. Furniss tabled a sample of Berseem clover. The crop, which had been irrigated to bring it up, had now reached a height of 17in. The clover had withstood some very heavy frosts.

Lyndoch, May 30.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), J. Mitchell, H. Klaube, H. Schrader, H. Kennedy, H. Springbett, E. Springbett, P. Burge, E. J. R. Woolcock, W. F. Haese, and J. S. Hammat (Hon. Sec.).

WINE.—An extract on the subject of "Wine and its Uses" was read by Mr. H. Springbett. Members were of the opinion that it was possible to make a wine distinctly Australian in character, if purity of quality and choice of variety were studied, and that this would be preferable to trying to imitate the makes and brands of other countries.

MacGillivray, May 28.

PRESENT.—Messrs. R. Wheaton (chair), H. Ayris, A. Burfitt, A. J. Nicholls, H. E. Petras, A. Stirling, jun., H. J. Wiadrowski, and H. C. Williams (Hon. Sec.).

GRASSES.—Mr. A. Burfitt tabled good stools of *Phalaris commutata*. It had kept green throughout the summer. He recommended its inclusion in pasture seedings, and stated that it was very hardy. Other members had experimented with it on good soil only, and had proved its value under such conditions. Both cocksfoot and perennial rye deserved free planting, for where tried on heavy loam they supplied green feed all the year with moderate stocking.

TRIFOLIUM SUBTERRANEUM.—The paper read by Mr. A. W. Howard, and printed on page 984 of the April issue of the *Journal*, was read by Mr. A. Stirling. In the discussion which followed it was mentioned that the grass had been grown successfully on a plot of ironstone soil protected from stock. Experiments on a larger scale gave only medium results, though it was evidently worth persevering with.

IMMIGRATION OF FARM LABOR.—The paper read by Mr. A. J. A. Koch, and printed on page 976 of the April issue, was also read. It was pointed out that the regulation requiring the deposit of £4 had been withdrawn. The general opinion was that newcomers as a rule were not worth current rates of wages until they had at least served a term under local conditions.

Morphett Vale, June 21.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. A. C. Pocock (chair), H. V. Sprigg, L. F. Christie, J. Perry, F. Rosenberg, E. Perry, A. Connoles, T. and A. Anderson, T. Higgins, H. O'Sullivan, W. Goldsmith, E. E. Hunt (Hon. Sec.).

ANNUAL MEETING.—The Hon. Secretary presented his annual report, which showed that during the year 12 meetings had been held, the average attendance being 10 members. Papers on the following subjects had been read:—"Mixed Farming," "Vines on Small Farms," "Barley-growing on Limestone as a Second Crop after a Crop of Wheat Grown on Fallow," "Growing all the Necessary Food and Corn for Feeding and Fattening Stock on the Farm," "The Value and Treatment of Stable Manure," "Breeding Farm Horses;" and various other agricultural matters of interest were discussed.

Mount Barker, May 30.

(Average annual rainfall, 30.96 in.)

PRESENT.—Messrs. H. N. Bell (chair), H. Jones, D. N. Wollaston, F. and H. Trelevan, F. Follett, A. B. Blades, A. E. and L. A. Cornish, J. Morris, Bert Pope, A. Fergusson, Joe Pope, J. Brinkley, W. Pearson, J. Woolley, J. E. Smith, J. Little, F. Simper, J. G. Thomas, J. Hender, J. Frame, S. J. Bishop, A. P. Herbertson, D. Monfries, P. Davis, B. Fidler, A. W. Howard, Fred. Virgo (Hon. Sec.), and four visitors.

PRGS.—Mr. H. A. Monk read the following paper:—"In introducing this paper I feel confident in stating that the pig has become one of the most economic and useful of dietary animals; in proof whereof it is only necessary to state that the food it consumes could not, in any other way, be so profitably utilised. It has been truthfully said 'The pig pays the rent.' The great antiquity of the hog is fixed from the fact that fossil remains of several species have been found in the tertiary or diluvial deposits in Europe, and of allied species in India. The wild hogs from which domestic breeds originated are natives of Europe, Asia, and Africa, and are found wherever the climate is sufficiently mild to afford natural sustenance in winter, and in a domestic state wherever civilisation has been extended. The origin of the domestic hog is well established by the fact that it will inter-breed and continue entirely fertile; the succeeding fertility of the offspring to the remotest generations proving the homogeneity of the species. In America, Australia, and in the Polynesian Group hogs were unknown until introduced. In England the wild species have long been extinct. In France they are nearly so; but in some parts of Germany, Denmark, Italy, Greece, and Asia Minor, they are still met with. In America swine are said to have been introduced into Hispaniola by Columbus in 1493; into Florida by De Soto in 1538; into Nova Scotia and Newfoundland in 1553; into Canada in 1608; and into Virginia in 1609. So great was the fecundity of swine in the Virginian forests, that 18 years after their introduction the inhabitants of Jamestown had to palisade the town to keep them out. Let us now take into consideration the value of the hog which, with the exception of cattle, is the most important to man as an article of food, not only for local consumption, but on account of its adaptability as pork for successfully standing long voyages, either barrelled or smoked, which renders it very valuable as an article for export. Its chief by-product, lard, enters very largely into domestic culinary, and it would be very difficult indeed, if not impossible, to find any other animal fat so suitable for that particular purpose. The Americans appear to have been the first to realise the immense possibilities and importance of improving the breed of pigs. In the year 1878 the three greatest hog-producing States were Iowa, Ohio, and Illinois. Of these Iowa contained 2,244,800, Ohio 2,341,411, and Illinois 3,355,500 hogs. In 1878 there were packed in Chicago alone over 5,000,000 swine, or one-sixth of the total number raised in the United States. It is quite evident that we have much for which to thank the Americans, especially in regard to the pig industry. They have the finest breeds in the world, which have been procured from India, China, and the Neapolitan. By crossing, these breeds have become unexcelled in any quarter of the globe. Their chief virtues are early maturity, aptitude to fatten at any age, and ultimate heavy weight of the matured animal. 'The Model Pig' may be briefly described as follows:—Fine bone, short legs, small head, medium length of body, thick, fleshy ham, thick shoulder, loin well ribbed up, very thin skin, and fine hair. Proper housing and good feeding are undoubtedly the keystones of success in the industry. The American system of manufacture is certainly the best in the world. Their factories are replete with all modern appliances, which enable them to profitably utilise every part of the animal; while machinery has superseded manual labor in practically every department, thus reducing cost of handling to a minimum. It is evident the pig is not

indigenous of Australia, but was imported in a domestic state by some of the early European settlers. The Chester White, the Cheshire, and the Essex were the first to arrive. Then followed at intervals the Berkshire, Poland, China, and the Yorkshire, while the Tamworth is quite a recent importation. I will deal with these breeds at a later stage. Let us now consider the question of situation and construction of piggeries, as there is nothing more important to the wellbeing of the creature under consideration than the selection of suitable grounds whereon to erect proper habitations. Many persons are under the impression that any hovel is good enough for the pig, and that it delights to wallow in its own mire. This is a most unfortunate mistake, likely to result in retarding both the growth and fattening tendency of the animals, and one which is often responsible for disease, causing great loss to owners. The most suitable position for piggeries is on rising ground with natural drainage. The back of the sties should be so constructed as to afford shelter from the weather. The open portion should face the rising of the sun. It matters little of what material the sties are composed, provided they are impervious to wind and rain. Particularly does this apply to the sleeping compartments, the roof of which should always be made of good straw thatch, for this substance tends to keep the sties warm in winter, but also forms the best protection from the sun's rays in summer, being to all intents and purposes a non-conductor of heat. The floor of the sleeping compartment should consist of boards raised at least 6 in. from the ground. The floor of the other portion of the sty should be constructed of some hard material, such as concrete, bricks grouted with cement, or other impervious substances, with a pit outside to catch all drainage. The sleeping quarters should be shut off from the main yard at least two-thirds of the way across. The pig is a refuse eater; in fact, dairying would lose much of its profit without the pig. Sour milk, buttermilk, washings, and scraps from the kitchen mixed with pollard, grain, &c., form an excellent and economical diet for pigs. Experience has taught us that all kinds of vegetables and animal food should be boiled, otherwise the pork always remains soft and flabby. Without grain pigs cannot be kept at a profit, as it affords both the means of bringing them to early maturity and developing size. I believe the best results will be obtained by feeding on milk, boiled potatoes, and barley meal well mixed, together with from $\frac{1}{2}$ pt. up to 1 qt. of peas, according to the size of the pig, once a day, and that at the last meal. A $\frac{1}{2}$ wt. to 1 wt. of coal should always be kept in the sty. The pigs will eat this very readily. Pigs kept clean and warm, and fed in the foregoing manner regularly three or four times a day, will develop and fatten up to 120 lbs. or 130 lbs. in from five to six months. I wish to state here that in feeding pigs, as with any other animals, regularity should be the order every day. Swine, in common with other animals, form habits, and learn to expect their meals at certain times, at which period the stomach is usually empty and ready to be supplied with food; consequently, if this demand of nature is not attended to, for hours perhaps after the appointed time, it can be readily understood that the animal becomes irritated, and the healthy working of their digestive organs is interfered with, which prevents the due performance of that functional activity necessary to ensure perfect digestion. As evils are likely, nay, surely, to occur from irregularity in feeding, I cannot too strongly impress upon feeders the importance of supplying their pigs with food at regularly appointed hours. In South Australia our pigs are deteriorating, and unless some enterprising person takes the matter up and imports other strains our pig industry will in a few years be in a very bad way. I have for some time been closely and carefully watching this very important matter, and I find that practically every breed in the State has been crossed and recrossed, and latterly much in-breeding has taken place, so that to all intents and purposes our pigs are one family. It is therefore necessary, in my opinion, to import a few pure breeds of Chinese, Siamese, or improved Essex boars for mating with the best of our sows, and thus establish a breed of pigs which will be a credit to our State and a substantial benefit to every breeder. I have stated that our pigs are deteriorating. You may ask for some proof of this. Well, I will ask you to bear in mind the model pig I previously described, and now call your attention to the form and shape of our pigs—long legs, long, lean hams, ill-formed heads; but the greatest proof of all is coarse hair and thick skin. These defects not only exist but predominate, and I regret to say have become the rule instead of the exception." The paper was discussed at length, and a number of questions were replied to by the writer. It was during the last six years that the South Australian pig had deteriorated. It was bad policy to feed the animals in the sleeping compartment. When the pig which had been provided with coal was killed, the flesh was found to be firm and white; but with animals which had access to charcoal, the flesh was flabby and of a dull brown color. Mr. Howard thought the deterioration of pigs in this State was due more to the indiscriminate mating of the animals than to the neglect of importing new blood. It was cruel to put pigs in a sty covered with an iron roof. Mr. Parsons

did not believe in raising the floor of the sleeping compartment. Mr. Frame and Mr. Simper both favored iron roofs for sties, as better drainage was provided, and the ventilation was superior.

Port Elliot, May 18.

(Average annual rainfall, 20½ in.)

PRESENT.—Messrs. H. B. Welch (chair), J. Chibnall, H. Green, F. Vince, J. Brown, W. E. Hargreaves (Hon. Sec.).

ENGINE v. BULLOCKS FOR PLOUGHING.—A discussion took place on this subject. Most members thought that the engine would do for flat, clean country, but for hilly and rough scrub country bullocks were cheaper. One man would be required to cart wood and water in order to keep the engine in motion, and if the plough became stuck, in all probability the strain would cause a breakage somewhere.

THE SOIL.—Mr. J. Chibnall read the following paper:—"Agriculture is founded upon the soil, and upon the skill of the farmer in making use of its inherent capacities depends the return he gets for his labor. To study soils one must have some knowledge of their origin and their relationship to the rocks that underlie them, out of which, in most cases, they have been formed. The various agencies which reduce rocks to soil, grouped under the general terms of weathering, may be distinguished as mechanical, including the work of alternations of temperature, frost, wind, rain, and glacial ice; and chemical, the complex effects of solution and oxidation. Oxide is a compound of oxygen and a base destitute of acid properties, and oxygen a gas forming part of the air. The great weathering agency in temperate climates is frost acting upon water contained within the rocks. The water expands as it freezes, exerts an enormous pressure, and causes the rocks to fracture. Even polished granite rapidly deteriorates in severe climates owing to the freezing of the water that finds its way into the minute divisions between the crystals. In nature all rocks are traversed by joints. These cracks are filled with water, and opened and extended by its conversion into ice in the winter. Finally a block is wedged off and a fresh surface is exposed to the action of the ice. Although most of the rocks are in the ordinary sense insoluble in water, few of them except pure sand grains can resist the attack of water charged with carbonic acid, which is formed of carbon and oxygen. (Carbon is an elementary substance—pure charcoal is carbon.) The rain when it reaches the ground has little carbonic acid in solution, but the gases in the soil contain a considerable quantity, derived from the decay of vegetable matter on the surface layer. From the water of these crystalline rocks are derived the sandstones, and directly and indirectly the sands now existing. The felspars, which consist of crystalline mineral found in granite, are all distinguished by the ease with which they are attacked by water containing carbonic acid, and those containing lime more readily so than the potash felspar. Calcium is an elementary substance present in limestone and chalk rocks. The calcium carbonate is never quite pure in the case of chalk and the purer limestones. The insoluble residue consists of fine red or yellow clays. Although the transition from soil to subsoil is gradual, one of the greatest distinctions between soil and subsoil lies in their respective texture. In wet climates the soil is mostly composed of coarser grains than the subsoil, and in dry climates the soil and subsoil appear to be almost uniform. The former is due to the rains constantly percolating through even the stiffest soils and washing down the finest particles. Between the sands and the clays come mixtures of all grades, better than the clays for working, and more fertile than the sands. In the main sand consists of grains of quartz rounded by continual rubbing and more or less colored by oxide of iron; in mass the chief characteristic is its want of coherence when dry. From a chemical point of view all clays are found to consist largely of kaolinite, the hydrated silicate of alumina (silicate found in flint, alumina the characteristic ingredient of common clay). One property of clay which is of great agricultural importance is that when in a wet state the fine particles can be caused to aggregate loosely by a variety of agencies, especially by the addition of a very small quantity of dissolved salts, or of lime, by causing the fine particles to form into aggregates and thus improve its texture. Chalk, or carbonate of lime is present in all soils, with the exception of a few extremely open sands. The term 'humus' is applied to the black or dark-brown material of vegetable origin which gives to surface soil its characteristic color as compared with the subsoil. It is essentially a product of bacterial action. There are a number of bacteria working in the absence of air. In the presence of air the humus forming fermentation is replaced by one which results in the complete combustion of the organic matter to carbonic acid. For this reason more humus is found in a pasture than in a continually aerated arable soil; more

again in clays than in lighter soils. The presence of chalk in the soils also assists in the destruction of humus, since it neutralises the acids. Humus is one of the greatest sources of nitrogen for the food of plants, and a soil well supplied with humus is generally fertile. Humus acts as a weak cement. Thus it serves to bind a coarse grained sand and, by forming aggregates of the finest particles, to render the texture of a clay more open. The amount of water which a soil will hold when completely saturated will depend upon the pore space—will, in fact, be the pore space—together with whatever water the material of the particles can imbibe without causing any swelling. As the rainwater enters from above, the surface of the soil is wetted first and the air within the soil finds a difficulty in escaping, so that after long continued rain the pore space does not become entirely filled with water. There is a great diminution in the rate of flow in a soil containing particles of clay. When a soil is saturated the whole pore space is filled with water. If this soil is allowed to drain, some of the water is pulling away by gravity, but much remains clinging round the particles in the stretched film condition, balancing the pull due to gravity. There is a layer of water much thicker in the lower than in the upper layers. Water will always move in a soil from a wet to a drier place. By increasing the tension of the surface film more water will be lifted from the subsoil, and will keep the top layer moister. Surface tension can only lift water as far as the film is unbroken; that is, as far as the unstirred soil extends; and this layer is protected from evaporation by the loose soil above. The loose soil becomes dry, but by reason of its discontinuity and coarse-grained condition, does not conduct the moisture from the firm subsoil to the surface to be exposed to sun and wind. The only loss will be of that water which evaporates from the moist soil into the air space of the loose upper layer. The deeper the loose layer thus formed the more effective it will be; and if it is destroyed by a fall of rain which consolidates a continuous liquid film from the subsoil water right up to the surface, the loose hoed ground practically forms a mulch. It is often noticed that a casual shower during a dry period may result in a greater drying up of the soil than ever. This is because a film of water able to lift water from the subsoil up to the evaporating surface is created. The main source of the soil warmth consists in the heat received from the sun in radiation. The power of soils to absorb the sun's rays depends very much on color. In black soils the absorption is almost complete. It is greater for red than yellow, and least in those which are light colored. The color of soils depends upon humus and hydrated ferrie oxide. Land which is protected from evaporation, and to some extent from radiation, by a layer of vegetation, is always both warmer and less subject to fluctuations of temperature than bare soil; hence a rolled and tightened soil will conduct the heat more rapidly to the lower layer than one which is loose. Soils naturally retentive of water are late, because the high water content keeps their temperature down. Many differences may be noticed between the quality of produce grown upon early and late soils. For instance, when grown upon adjoining clay and sandy soils, apples from the former are smaller and greener, but contain a greater portion of sugar and acid, and possess a higher aroma than apples grown upon lighter and earlier soil. Wheat grown upon clay is generally of better quality and stronger than that yielded by lighter soils, whereas lighter soils yield finer barley. In the analysis of a soil without doubt the most important figure is the proportion of calcium carbonate, for on that must be based the decision not only of whether liming is necessary, but what classes of artificial manures should be used. Where the calcium carbonate is scanty, manures like superphosphate and sulphate of ammonia should never be used, but basic slag or some neutral phosphate, and nitrate of soda, as a source of rapidly acting nitrogen on the other can be applied with advantage. The texture of the soil, the rapidity with which decay and nitrification of organic matter take place, freedom from fungoid diseases, all depend on an adequate proportion of calcium carbonate, say from $\frac{1}{2}$ per cent. to 1 per cent. In an ordinary soil containing a sufficiency of calcium carbonate, the application of soluble phosphoric acid such as superphosphate, will chiefly result in precipitation, or reverted phosphate, wherever the solution meets with a particle of calcium carbonate. This reverted phosphate is a compound easily soluble in weak organic acids, or in water containing carbonic acid; hence the great value of applications of superphosphate on soils rich in lime; for this is a readily available phosphate, and is very quickly disseminated throughout the ground in a state of fine division. Few soils can be described as absolutely barren, yet land is met with that yields such poor crops that it may fairly be designated as sterile. Sterility due to chemical causes is perhaps most generally caused by the absence of calcium carbonate from the soil. In arid climates the rainfall is often insufficient to produce percolation through the soil and subsoil into the underground water system. In consequence the salts produced by the weathering of the rocks tend to accumulate in the subsoil, and may be brought to the surface by capillary action, so as to cause entire sterility. All vegetation is destroyed,

except a few plants which seem tolerant of large quantities of saline matter, such as the Australian saltbushes. A heavy rainfall may be followed by a rise of alkali, because a connection is then established between the saline subsoil water and the evaporating surface; whereupon a continuous capillary rise of salts takes place, followed by the crystallisation at the surface. The composition of the salts varies. As a rule sodium chloride predominates. The manuring of sandy soils must be based upon a liberal use of lime, because of the ease with which water percolates and removes the calcium carbonate. The manurial requirements of the loams vary with the origin of each soil, and are largely conditioned by its poverty or richness in calcium carbonate. Calcareous soils are generally very fertile. Clay soils also show a deficiency of phosphoric acid and respond freely to superphosphate wherever there is enough calcium carbonate in the soil. Basic slag is the typical phosphatic manure for the strong soils which retain sufficient water to render the phosphates active."

Uraidia and Summertown, June 3.

(Average annual rainfall, 42½ in.)

PRESENT.—Messrs. E. Hart (chair), E. Hawke, H. G. Dyer, S. Hawke, Kessel, Moulds, Rowe, Prentice (Hon. Sec.).

TURNIPS.—Mr. Kessel read a paper on this subject, in which he expressed the view that probably all kinds of turnips, cabbage, &c., originated in the Brassica family. The feeding value of the turnip was comparatively low, water entering into its composition to the extent of 90 per cent. It contained a small percentage of sugar, and no starch whatever. It was a quick grower, hardy, and, to a certain extent, restorative. The yellow turnip was better than the white. In the Hills district the time for sowing was between August and April, the favorite variety for market purposes being the Purple Top. This vegetable contained a large amount of sulphur, and successful cultivation depended on a liberal supply of manure. Light soil was found to return the best crops, but practically any soil, if worked properly, would grow turnips. They did well when supplied with stable manure, but also responded to a good supply of superphosphate. The addition of nitrogen to the soil was essential if a good crop were wanted. The most serious enemy of the turnip was the green caterpillar, which ate into the heart of the vegetable. As it was a night feeder, the best plan of destroying it was to sprinkle the crop with lime when it was damp with dew or rain. Diseases which affect the roots could be counteracted by selecting good seed, tilling the ground well, and dressing with a liberal supply of soot and lime. Salt could be applied when working the soil to remedy these troubles, but it should not come in contact with the plants. In discussing the paper Mr. Dyer said light land was preferable for growing turnips, and the yellow turnip was the best. Mr. A. Moulds believed in a sandy soil well turned over and manured with super. and bonedust. Mr. E. Hawke preferred sandy loam well manured with lime and super. Mr. Rowe said a dressing of sulphur would arrest any diseases which might affect the crop. He preferred super. and bonedust super. for manuring in sandy land. It would pay to grow an early crop of the Munich variety.

Woodside, May 23.

(Average annual rainfall, 31 in.)

PRESENT.—Messrs. H. Rollbusch (chair), C. W. Fowler, J. Lauterbach, R. P. Keddie, G. Johnson, A. Moore, W. I. Fuller, W. King, R. W. Kleinschmidt, J. Drummond, W. Morcom, and A. S. Hughes (Hon. Sec.).

ORCHARDS IN CONNECTION WITH DAIRY FARMS.—The following paper was read by Mr. A. H. Moore:—"Dairying is one of the principal industries in the Onkaparinga district, and with better appliances and better methods than were adopted 20 years ago and a much more open and extended market, due to the export trade, it is consequently more profitable. On most farms it is carried on in conjunction with hay-growing, potato-growing, pea-growing, pig-raising, &c. Otherwise the labor necessary would only be required during a month or two of each year, and little labor would be needed for the rest of the season, leaving quite half the year unproductive, as far as production is concerned. Hay-growing is not so profitable in these districts as in the more open districts such as the Lower and Upper North, because of slower methods of cultivation. For instance, where a six-furrow or even 10-furrow plough and a team of six or more horses are used in those parts, in these districts nothing larger than a three-furrow plough is used.

Smaller holdings are also responsible for less hay being grown. Hilly country hampers the farmers and makes hay-growing considerably more costly than is the case in level country with larger paddocks, &c. Pea-growing, of course, is only carried on to a limited extent, sufficient being grown to provide seed and a small surplus for sale. The great advantage of pea-growing is that it puts the land in good heart for a crop of hay. Potato-growing pays where irrigation can be resorted to. They are grown in summer, otherwise frosts are likely to spoil the crops. There seems to me to be nothing that works in with dairying so well on the smaller holdings in the Onkaparinga district as fruit-growing. I have always maintained that the Onkaparinga district, as well as some other districts in the vicinity, must either have cows or fruit trees on the land to yield the greatest financial returns, and if both are present so much the better. Land is expensive in these districts, and we cannot hope to compete with cheaper land and larger blocks in hay-growing, wheat-growing, sheep and cattle raising, consequently we must go in for occupations yielding a greater return per acre. Dairying is one of these occupations, and although it is more tiresome, and perhaps a great tie, yet to those who apply themselves to it there is no doubt about its being profitable. Fruit-growing is another industry that is more profitable per acre than the other occupations that I have mentioned, as instanced by the high price of orchard land, which can be put down safely at from £50 to £60 per acre for land carrying fruit trees in full bearing. Take 100 acres as an illustration. One hundred acres put in with fruit trees would undoubtedly pay well, and one could specialise in fruit-growing; but there is the waiting for returns until the full-bearing stage is reached. It is necessary to have something to live on during that time. There is also the difficulty of regulating the labor when it comes into bearing, and the difficulty of obtaining labor of the right sort at the right time. The same thing applies to dairying alone. Although the returns are immediate, a good deal of labor is necessary in the flush of the season; but there is not that something to fill in the whole year with steady labor yielding a steady income. If 10 or 12 acres are devoted to an orchard and the remaining 80 or 90 acres to dairying, it may be confidently expected that the dairy will pay from its inception. The cultivation of the orchard will fill in portion of the time until it comes into bearing. Then the two industries would yield a more or less steady income during the whole year. This district is especially suited for apple-growing, and apples are about the least perishable of all the fruits, which enables them to be carried over long distances and handled rather more roughly than the more delicate varieties. This fruit is also the most suitable for export. The export fruit trade has now got beyond the experimental stage, and is on such a sound commercial basis that there need be no hesitation in growing specially for the export trade. The industry is fast becoming one of the principal resources of Australia and Tasmania. At the same time, the export trade in butter is likewise on a very sound commercial basis. I do not think there is a sounder investment than these two industries in conjunction with each other. Furthermore, dairying itself is generally considered to be the safest and surest, as far as rural industries are concerned, and the same may very well apply to fruit-growing, for wet seasons do not affect the crops at all, nor do the dry seasons to any extent if the trees are cultivated and pruned on sound lines. These industries combined go nearest to solving the labor problem on farms. The amount of labor necessary is constant and steady, enabling farmers to keep almost all their men throughout the year. There may be said to be only about one month, or two months at the outside, that can be called at all slack. The work of the season may be divided up as follows:—Commencing with the opening of the season, September and October, dairy occupations are becoming active, and the extra work of looking after and milking fresh cows and disposing of the produce, together with spraying, which would be necessary in the orchard, occupies all the time. Immediately following is the hay harvest. Immediately the harvest is completed, say, at the end of January, the fruit crop is reaching maturity, and picking may commence in February, while dairying is steadily diminishing. Until the end of April this continues. The ploughing and seeding season then commences, and is continued until perhaps the end of June. At the same time the fruit crop must be got away, and this work will probably continue until the end of July, or even August. Pruning, cultivating the orchard, and winter spraying, if necessary, fill in the time until September. The plant necessary for carrying on the combined industries is very little more than would be required for dairying alone. A spraying outfit and a fair stock of cases is all that is required beyond ploughs, cultivators, harrows, horses, &c., as used in ordinary dairy-farm work. Another important side line is brought into more prominence through fruit-growing in connection with dairying, i.e., pig-raising. Pig-raising in connection with an orchard alone is not a success, although it is with a dairy. With the by-products from the dairy for fattening, and the windfalls, rejects, &c., from the orchard, amounting to anything between 400 and

1,000 cases, there should be abundant feed for keeping stores, ultimately to be fattened. By this means all refuse from the orchard is turned to some account without the expenditure of a great amount of labor. The number of pigs kept can always be regulated by the amount of feed in sight. Dairying is considered by many to be a tie, and so it is if there are only one or two to do the whole of the work; but if one is able to employ more regular labor there is always the opportunity of one or two being able to stand out and have a change. Though this may not be the most pleasant of occupations, yet it is not what it was 15 or 20 years ago. Modern methods have done much to make the industry a more pleasant and profitable one. The general adoption of the cream separator, the factory system of butter and cheese making, leaves the dairymen only the work of milking and feeding his cows and delivering the milk or cream. In many cases not even delivering is necessary, as the cream is very often collected at the door. Orchard work can be very well termed a pleasant and an interesting occupation in these days of scientific pruning, cultivation, &c. The new type of tree is a very different thing from the old spreading skyscraper, the work in connection with which was laborious from beginning to end. The modern low spur-bearing tree has lightened the labor connected with fruit-growing very considerably. I have come to the conclusion, from my own experience, that these two industries will work together. This district is well suited for them to be worked together profitably, and by this means more regular employment will be found for a greater population than is the case at present." [We regret that this excellent paper apparently called forth no discussion.—ED.]

Woodside, June 26.

PRESENT.—Messrs. H. Rollbusch (chair), C. W. Fowler, R. W. Kleinschmidt, W. Morcom, R. P. Keddie, A. S. Hughes, J. A. Morcom (Hon. Sec.).

LUCERNE.—Mr. W. Morcom read the following paper on this subject:—"In districts similar to Onkaparinga every farmer should grow a small paddock of lucerne, as it is one of the best of fodders, especially where it is irrigated. Even without irrigation it will return a good profit. As a summer feed it is very valuable as green feed, and is always available for stock when everything else is dry. Lucerne, on land that is suitable for its growth, will return three or four crops a year. Where it is irrigated it grows very rapidly, and will return very heavy crops. Last summer I saw lucerne which had grown to a height of over 4ft. on land which had a very dry appearance and had not been irrigated. By the time the first crop was finished the second crop had grown a foot high. It had been sown in the preceding spring. One very good point in regard to lucerne is that, when not needed for green fodder, it makes excellent hay. If it only returns 4 tons or 5 tons to the acre for one year, it yields a great deal more than can be secured from either oats or wheat. If irrigated it will return 7 tons or 8 tons per acre. The value of lucerne hay or chaff is greater than either oat or wheat hay. In Victoria, only recently, when prime wheat chaff was selling at £6 per ton lucerne chaff was returning £7 per ton. About May or June a dressing of bonedust should be applied to the crop and drilled on to the land at the rate of about 1½cwt. to 2cwt. to the acre. The ground should be harrowed with sharp harrows. The best time to sow lucerne is in the spring. By many people it is sown with the hay crop, so that the growing wheat will protect it when the plant is young and tender. The land should be well worked to a fine surface. Then sow the seed and use a very light leveller in order to smooth the land and give the seed a light covering. If farmers and dairymen were to grow more lucerne they would, in a very dry year, such as we have just experienced, be far better provided with food for stock than they are in many cases at the present time." The paper was well discussed, and members all agreed that lucerne-growing was a very profitable venture.

SOUTH-EAST DISTRICT.

Kalangadoo, June 8.

PRESENT.—Messrs. M. Kennedy (chair), E. Earle, J. Mitchell, J. McDonald, S. Tucker, J. and R. Boyce, A. Haines, A. Gibb, T. Bott, and G. Bennett.

HAY-GROWING.—The following paper was read by Mr. E. Earle:—"My 30 years' experience with hay and chaff convinces me that it pays to grow nothing but a first-class quality of this product; for bad or inferior hay is unprofitable to the producer as well

as to the purchaser. The farmer will not get such good work from his horses, nor will they keep in such good condition if they are fed on poor hay. He will also have difficulty in selling his hay. To produce a good sample the farmer should endeavor to get his land as clear of weeds as possible before sowing. I have grown the following varieties of oats for hay:—Tartarian, Poland, Potato, Calcutta, and Algerian, and I find the Algerian the best and most profitable. The Potato oat makes good sweet hay for the farmer's own use, but it is not so profitable for sale, being light in weight. I have not had experience with many varieties of wheat, but I find White Tuscan makes good hay. If the seed is sown early, and it tends to a vigorous growth, it is better to feed it off when almost 6in. or 8in. high, as it will be found to make better and heavier hay. The next important thing is the time to cut the crop. Some cut when it is too green and some when too ripe—more often the latter. With oaten hay there is a stage by cutting at which you can secure good grain and also a green tinge in color. At that stage the chaff when cut will have a good smell and is much sweeter. Wheaten hay should be cut well on the green side. After the hay is cut it can lie a day or so before stooking if the weather is fine; but if there are any signs of rain it should be stooked at once. The round stooks are the best, about 20 to 25 sheaves being put in a stook. If well stooked no rain will hurt the hay. Under no consideration interfere with the stooks after rain. Only stand up the fallen sheaves. The time for stacking depends on the weather; but as soon as the knot will break the hay is fit. If hay is left in the paddock too long it loses in weight and nourishment. Another important thing is the building of the stack. Tons of good hay are wasted through stacks being badly built. A haystack should not be built too wide, and the sides should never be higher than the middle. Bind with the ear-ends outwards. It is a mistake to have a high roof, as this makes the middle sink low. If a stack is well built it will not take in the rain, but it is always best to thatch as soon as possible to prevent it discoloring. Hay should never be cut when wet or damp, except in the summer months, when at times a little spraying is necessary. For general use cut to the length of $\frac{3}{4}$ in. for young horses, $\frac{1}{2}$ in. for cows, and for aged horses I prefer $\frac{1}{4}$ in. length. With regard to the purchaser of chaff, how often will a man come to the farmer and ask what he wants for his chaff, and when he is told a fair price for a good sample, will tell him he can get chaff from so-and-so for a much lower figure. In most cases he has never seen either of the samples. Surely any man who has had experience in working and feeding horses should know that good chaff is worth from 5s. to 15s. per ton more than inferior. I cut most of the chaff in this district for two seasons, and in a small district like this the stacks could be classified into three different grades, viz., first, second, and third class, the latter being in no way comparable with the first. No doubt all obtained the same price in the market. Now, what encouragement is there to produce a good sample? I would like to ask one question. If a district does not produce a good quality and sample of this product, where does the fault rest, with the producer or the purchaser?"

Millicent, June 11.

(Average annual rainfall, 28 $\frac{1}{2}$ in.)

PRESENT.—Messrs. G. Mutton (chair), H. F. L. Holzgreffe, J. J. Mullins, J. Bowering, H. Oberlander, H. Day (Hon. Sec.).

DISEASES IN SHEEP.—Mr. Oberlander initiated a discussion concerning diseases in sheep by reporting his unfortunate experiences with animals affected with lung worm. The disease was contagious, and he found that it was mostly confined to sheep on swamp lands. Sheep removed from low-lying country carried the trouble with them and spread the disease wherever they moved. He favored draining the swamp lands, if only for that purpose. Mr. Holzgreffe considered that if graziers desired to own healthy flocks they must rear them themselves. It was a mistake to expect too much from sheep bought at auction. The main thing was to keep sheep healthy when they were young. Only the best lambs should be retained, and gradually a good flock would be built up. Sheep could not have too much salt. Salt and sulphate of iron were the simplest and best remedies for a large number of complaints, and in spite of a popular belief to the contrary, it was needed by sheep near the coast as well as inland. Poverty was the cause of half the sickness in this locality. A strong sheep could throw off disease, when it was almost hopeless to attempt to cure a poor one. He advised graziers to always have a clean paddock on hand. It was a mistake to allow sheep to trample over the feed continually. Small paddocks and frequent shiftings were advisable. The Hon. Secretary said worms were a common ailment. It was easy to cope with stomach worms by drenching. Neglecting to drench in time was often the cause of serious loss which could have been avoided.

EXHIBITS.—Mr. Oberlander tabled samples of Adam Prolific potatoes grown by Mr. Hart, and of Red Skins and Carmens grown by himself. The Prolific variety, especially, was much admired. The Chairman expressed the opinion that the Carmen variety was the potato that would be the favorite in the future. Dunn's Seedling and Jonathan apples, grown by Mr. J. H. Sudholz, of Kalangadoo, were also shown and admired.

Mount Gambier, June 8.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. A. J. Wedd (chair), Watson, Bottrill, Sassanowsky, J. F. Holloway, Wheeler, Kilsby, Pritchard, Smith, Major, Engelbrecht, Schlegel, F. Holloway, Ruwoldt, Pick, G. Collins, D. A. Collins (Hon. Sec.).

SHEEP-DIPPING.—On the motion of Mr. Bottrill, it was decided that this Branch of the Bureau write the Premier, with a request that the Stock Diseases Act be amended, to make it compulsory for owners of sheep to dip them within 60 days of their being shorn, but not between April 1st and November 1st. Precautions in this regard were necessary, particularly in the South-East.

EXHIBITS.—Mr. Fowler produced a potato affected with Irish blight, and another from Millicent considerably browned inside, in order that members could compare them. The cause of the discoloration in the Millicent potato was, he said, an eelworm. The blighted tuber was picked out of a parcel of seed potatoes which had been imported from Victoria. The Chairman showed 20 varieties of apples grown by him at Ardno. He also exhibited an apple badly affected with "bitter pit." Mr. Fowler stated that this disease appeared to particularly affect the yellow-skinned sorts. It seemed to be the result of a constitutional defect in the apple. Mr. McAlpine, the fruit expert of Victoria, was trying to find a cure.

SPRAYING POTATOES.—Mr. R. Fowler read a paper dealing with experiments conducted in the South-East by the department (details of which will be printed in the next issue of the *Journal*).

Naracoorte, May 11.

(Average annual rainfall, 22 in.)

PRESENT.—Messrs. L. Wright (chair), W. E. Rogers, E. Coe, Geo. Williams, A. Caldwell, C. Bray, W. Loller, A. Langeludecke, jun., and S. Schinckel (Hon. Sec.).

IMPORT DUTY ON MANURES.—Members discussed at length the proposal that an import duty should be levied on manures. The suggestion was distinctly antagonistic to the best interests of the farming community, and members decided to oppose it.

SEED WHEAT MALTING.—Mr. Schinckel said that seed wheat very seldom malted in the ground in this district; but if it were sown on well-worked fallow in dry weather there was a danger of this trouble being encountered. Under such conditions it was not advisable to pickle the seed. There was less trouble with smut when the germination was slow. Mr. Bray's experience led him to the belief that the safest time to sow wheat in this district was between the middle of May and the end of June. He had put in a crop in April, and while the rains gave it a good start, and it promised well, the growth suddenly stopped. Mr. Loller had recently sown some rye on good fallow land after rain. Some of it came up, and a good deal of the grain appeared to have malted; but this was not the case, as after a further fall of rain, practically every grain germinated. He did not think there was any danger of seed malting in fallow land in this district. He had put in some well-worked fallow recently with wheat, oats, and barley, and every grain of it came up. He therefore believed there was sufficient moisture in the fallow in the South-East to bring up the seed. The Chairman said there was greater danger of seed malting where there was moisture; but the question they had to consider in putting in a crop in the kind of weather they were experiencing this season was whether there was sufficient moisture to make the crop shoot.

Penola, June 1.

(Average annual rainfall, 26½ in.)

PRESENT.—Messrs. Peake (chair), Adamson, Strong, Darwent, Miller, Kilsby, McBain, Warner, McKay, Ockley (Hon. Sec.), and five visitors.

ANNUAL MEETING.—The Hon. Secretary presented his report of the operations of the Branch during the 12 months. Eleven meetings had been held, with an average attendance of about 11. Papers were read on the following subjects, viz. :—"Maintaining the Fertility of the Soil," "Breeding Light Horses," "Fruit-drying," and "Preparation of the Seed Bed." Discussion took place on "Rolling Crops," "Easier Terms for Closer Settlers," "Formation of a Horse-breeding Society," "Rabbit Destruction," "Selling Fat Cattle by Live Weight," "Provision of Farm Laborer's Blocks," "Noxious Weeds," "Weighing Wheat in Bulk," and "Immigration." At the invitation of this Branch, several members of the Millicent Branch visited the district to see the Coonawarra Fruit Colony. The outing was both pleasant and profitable, and it is to be hoped that similar conjoined outings will be made every year. The cereal-growing season of 1911, i.e., from May 1st to November 31st, was comparatively dry, since during that time the rainfall was 15in., i.e., 5in. below the average, and 9in. below the fall for the 1910 season. Moreover, the beginning of the winter—May, June, and July—was 10 points wetter than the average, the ground being wet when seeding operations should have been in full swing, thus keeping the drills off the prepared ground and allowing the weeds to make headway. Conditions were very favorable for seeding until the 14th of May, from which date until June 15th, just one month, 5½in. of rain fell on 23 wet days, which did not allow of satisfactory seeding except on very dry ground, till the end of June. The crops sown then were severely checked by numerous frosts experienced in July. Following on this during the remaining four months of growth the rainfall was about 1½in. per month below the average; while during the continued dry spell from September 28th to December 4th, a period of 10 weeks, only 80 points fell, which was 3in. below the average for that period, and 4in. below the fall for the corresponding period in 1910. The season commenced wet and finished dry. Plants when heavily watered at the start needed heavier watering throughout the whole period of their growth than was the case if they received very little water at the beginning, because in the latter case the roots would go down deeper in the initial stage of growth; consequently the plant could resist dry conditions better, although the frosts of July would have had the effect of forcing the plants to make root growth. Very late crops were slightly assisted by the extra heavy downpour on December 5th, when 83 points fell, and December 12th, when 160 points fell, which were the heaviest falls for a single day's rain recorded during the whole year. It was noteworthy that most of the rain fell during the night, and there was no very heavy rain. Mr. McKay said that to obtain best returns all crops, with the exception of barley, should be drilled in in May. This better enabled the young plants to withstand the winter.

Wirrega, May 25.

PRESENT.—Messrs. Fairweather, C., E., and F. Meier, M. and J. Green, Bice, Purdie, Exton, R. Williams, F. and A. Densley, L. J. Cook (Hon. Sec.), and one visitor.

ROLLING AND HARROWING GROWING CROPS.—The paper on this subject read by Mr. Rae, of the Tatiara Branch, printed on page 1095 of the May issue, was read and discussed. Members generally agreed with the points mentioned in the paper, but it was thought that the practices were not applicable in this district on account of the patchy nature of the soil. Where it was very sandy it was found that the roller was much more beneficial to the land than the application of the harrows.

MALLEE SHOOT.—Considerable discussion took place with regard to the strong growth of mallee shoots after land had been cultivated and manured. Members were undecided as to whether the superphosphate was responsible for this growth, or whether the cultivation was the cause. [Probably the stronger growth is due mainly to cultivation, and not to the relatively high dressings of super. applied.—Ed.]

